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EDITED BY
GREGORY STRAGNELL, M. D.

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Allport, Frank, M. D., Chicago, Ill.
Anders, James M., M. D., LL. D., Philadelphia, Pa.
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Robinson, M. R., M. D., F. A. C. S., New York.
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*Wolbarst, Abr. L., M. D., New York.
Wolferth, C. C., M. D., Philadelphia, Pa.
Wright, Jonathan, M. D., Pleasantville, N. Y.

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Modern Commentaries on Galen

*The Organs of Respiration and the Voice and Their Physiology**

By JONATHAN WRIGHT, M.D.
Pleasantville, N. Y.

The fundamental vice of theory common to every age in the evolution of scientific thought, but most glaringly exhibited in the anatomical conceptions of antiquity, is in making it the master instead of the servant of the mind. In anatomy the ancients formed an idea of what the structure should be to account for or serve for some physiological function badly understood and itself not attentively studied, and then despite the continual obtrusion of anatomical facts upon their attention they ignored them or actually distorted them in the interest of their theories. The internal thoracic anatomy had to conform to the idea that the inspired air, the pneuma, the vital element, the food of life as it still remains, supplied man not with physical energy alone as we now know it, not alone to cool and moisten the blood, as was prominent also in ancient thought and to which we still may not be unwilling to subscribe, but with intellectual and moral faculties as well, the gift of the gods, which were carried with the blood to the heart, thus forming a link of the pantheistic world soul with the human soul. I will not say that in every thinker's mind it was thus so simply and confidently formulated as I have baldly stated it here for the sake of brevity, but essentially this was the trend of ancient cosmic philosophy and of ancient religious thought very much more closely affiliated then than now. It would be a loss of time to show that there had existed ever since Alcmaeon some six hundred or seven hundred years before Christ a better physiological theory than this, but it suffices to say this was the prevailing conception of respiratory function and it is perfectly easy to show how much truth we can extract from it by its liberal interpretation, but from this I must also abstain. The air and the blood in the lungs underwent mutual modifications which prepared them for the heart, the seat of thought and emotion and in fact the centre of life, protected from injury by the soft substance of the lungs around it so that it could not bruise itself as it kicked against the ribs. This was the thought not alone of Æschylus but much later of Aristotle, the greatest scientist of antiquity as Plato was the greatest thinker. The elasticity of the lungs helped it to rebound and added vigor and elasticity to its action. This latter was a conception Plato, in the Timaeus (70 C), furnished to Galen of the heart and lungs, surrounded as they are with strong membranes also protecting them.

Daremberg (1) in a footnote copies a story from Hoffman and Bauhinus, which is sufficiently amusing, as to a dispute two anatomists, who were earnest students of Galen three or four hundred years ago, had with one another while in attendance on a German princeling, as to the position of the heart. In the absence of human dissection Galen had to depend for much of his anatomy on experience with dissection of animals and reasoning from them to man he places the heart too near the centre of the thorax (5), following Aristotle (2), who claims for it this position of honor as the centre of life and thought and, in consonance with the theory above, central, upwards rather than downwards, forward rather than back, though elsewhere (3) he gives its sheer to the left correctly and Galen follows him here again (4). In this confusion of authorities the seventeenth century disputants who had as yet not done much dissection themselves of any kind went astray. The Duke of Baden had palpitation of the heart and his medical counsellor called in two wise men of Heidelberg as consultants. As a result the barber was called in to put a blister over the heart and he put it over the centre of the chest. The prince angrily scolded him for his ignorance and the barber called on the doctor. The latter, being questioned by the irate patient as to the position of the heart, declared it was in the centre of the chest. Still more excited his Highness called for the Heidelbergers. One of them came and said the heart was to the left, whereupon the prince dismissed his attending physician with contumely. The latter rebuked the consultant for his treachery and protested

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*Read at Washington, D. C., at the 44th Annual Meeting of the American Laryngological Association, May, 1922.

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he had the support of Galen and all the anatomists. The dispute waxing warm and coming to the prince's ears the consultant had to make his assertion good by opening the thorax of a pig and showing the prince the situation of affairs. After a great deal of discussion among the profession whom the bold consultant opposed on the authority of the autopsy while most upheld the teachings of the ancients, a petition was made to the prince and he took back his medical attendant, but at a reduced salary. Even three hundred years after the dissection of the human body had begun we thus see the persistence of the blight of Aristotle's theory. The heart ought to be at the centre of things and if dissection shows it is not, so much the worse for human dissection.

Galen is much impressed by the way the thoracic organs and particularly the heart are protected not only from external blows and jars but from the functional movements of each other. The lungs enfold the heart with five lobes, as fingers would surrounding it in the hollow of the hand, lining the thoracic walls like a veritable air cushion is the idea. He dwells on its tough fibrous structure. Despite the fact he rejects finally and forever the idea the heart is the origin of the nerves, one argument hitherto being based on the idea the membranes around it are nervous in character, he nevertheless feels the atmosphere created by this conception, which Aristotle had adopted from earlier anatomists. The former centre of life had to be protected, as we would say, out of deference to public sentiment, and Galen exhibits this feeling when he partially accepts the view that the heart being surrounded, we may suppose, by so many safeguards is never itself attacked by disease. He modifies this a little by saying hardly ever. Nevertheless the description Galen gives of the anatomy of the heart surpasses anything by far that Aristotle has left or any other author whom we know of before the time of Galen, at least any one of whose work we have even fragments, but for all that from Galen himself, from the fact that he does not vaunt his own knowledge of the vascular system to the skies, as he does his achievements in the matter of the recurrent nerves and the functions of the spinal nerves, from our knowledge of the character of the man we infer he is detailing to us much which was the knowledge of his epoch when he talks of the heart and lungs and the blood current and of the respiration.

In his manual of dissection (*De anatomicis administrationibus,* as Kühn calls it) the themes of which according to our ideas should be entirely objective, undisturbed by any thought except of what can be seen, we find them continually subjected to teleological considerations. The Utility of the Parts, one of his other treatises, with which we are here chiefly concerned, is constantly in his mind. The size of the animal does not determine whether the heart has three cavities or not (the right auricle in Galen's anatomy belongs not to the heart but to the pulmonary vein), it was the air intake and the voice production settled all that. It was a first consideration with him not what he actually saw but what he *should* see to prove that "nature here, as in all other matters, does nothing in vain; everything is of some use" (7). In his striving thus to understand her and to refute Aristotle, he missed after all the significance of the cardiac ventricles and auricles and the way leading to a suggestion of the true mechanism of the circulation, but it is very difficult indeed for the modern student to perceive just what picture he formed in his mind of the course of the blood current in the heart and lungs and the general circulation and one becomes often hopelessly confused with his venoarterial and his arteriovenous terms for vessels and their tunics. The arteries, holding air, had thicker coats to make them air tight; blood being thicker could travel by itself in the veins along thin walled tubes without danger of leakage, and the veins not being stiff they could insinuate themselves better into various localities where they are found. Among the marvels of the providence of God, for Galen found in the ancient religion a basis for his teleology, in the mechanism of the thorax there was a power in the lung itself to contract independent of, yet consentaneous with thoracic contraction. This was the reason the pulmonary artery and veins had soft walls so that they might fill and be emptied by thoracic and pulmonary impulse, but the other veins in which food was prepared it was better to have unchanged so that the blood content was constant. The body is nourished by them, the tissues drawing the blood through their tunics to themselves by their inherent power of attraction. Notwithstanding his frequent revolt from him the entelechy of Aristotle had to interfere with every other thing to get Galen out of a hole.

The pulmonary veins need not supply much nourishment to the lungs as they need but little, hence their wall tunics are denser, but yet not so dense that some of the more attenuated air and such part of the nourishment as was in the form of vapor, sufficient for the scanty nutritional needs of the lungs, might escape through them, not of course the thick and sedimentary part of the blood such as nourished the liver (8).. All we can say in favor of this way of mind working is that the perpetual need for pores through which the contents of the vessels can escape doubtless played its part in all we have learned in regard to the biophysics and biochemistry of the tunics of the vessels in the last two thousand years, and in all fairness to Galen and in the face of all the scientific methods now cherished that must not be forgotten, for after all absolute objectiveness in the workings of the human mind is a mere myth. It is curious to see how close such a method could take Galen, fifteen hundred years before the microscope came into use. "In the whole body there is a mutual anastomosis of minute mouths and openings in both the arteries and the veins and these let pass both blood and air from one to the other through certain invisible and narrow channels."

For the Galenic circulation as well as for the Harveian we see the capillaries, though not found, had to be imagined. These acted it seems not only as communicating channels between artery and vein but the whole as a sort of reservoir for the blood when it surged out of the thorax on expiration causing a compression of the thoracic veins. The channels by which the blood is expelled from the heart are arteries in the modern usage. In the Galenic usage our pulmonary artery was a vein because of its structure and because it was supposed to nourish the lungs. We call the vessels that pour blood into the heart veins, but for the ancients the pulmonary vein was an artery because it carried air from the lungs to the heart, Erasistratus thought without and Galen thought with blood accompanying the air, even though its walls are those of a vein. The heart beat was not due to contraction in our sense, but the impulse felt both in the heart and the systemic arteries was due to the throb of the pneuma. The air that had been taken in and elaborated in the lungs and delivered to the heart or a part of it was the vital force usually identified with the soul of man, thus in direct continuity with the soul of the world.

"The number of the ventricles of the heart is not the same in all animals for in those which inspire the air through the pharynx, through the nose and the mouth, immediately following on these is the lung and the right ventricle of the heart but for the remainder there is neither any lung nor any size to the right side of the heart, for these two things necessarily are intimately dependent on the lungs—the voice of the animal and the right side of the heart" (7). This is not exactly the Latin translation of the Greek text of Kühn nor the French translation of Daremberg, but this rendering seems to me called for despite the disconcerting absence of mention of the larynx. "The right ventricle is made for the sake of the lung, the lung itself is the instrument of respiration and of the voice." To be sure he is only intent on showing that Aristotle was wrong to make the number of cardiac ventricles depend on the size of the animal, yet it is singular that Galen, who elsewhere in this same book elucidates the anatomy of the larynx, in a way he claims originality for in clarion tones, and of which to tell the truth he had a right to be proud in his day, it is singular, I say, that he makes no mention of larynx or trachea or bronchi here where he specifically refers to the voice.

The need of the heart valves is felt and this so obviously they could scarcely escape observation, but the prepossession of the mind with the idea that the chief propulsive power acting on the blood current is the contracting thorax is so great that they and of course their physiological action receive a confused though detailed description (9). A very interesting chapter in the history of the development of our knowledge of the portal circulation is to be found in Galen, but this we must pass over with the remark that though it was allowed in antiquity that the arteries took their start from the heart the veins were said to arise from the liver. Galen even made the pulmonary veins proceed from the heart to the lungs though he knew the blood current was in the other direction, but he has a rather hard time accounting for his inconsistency in the course of which he ridicules Asclepiades (10) and criticizes Erasistratus for saying the structures varied because of the air one carried, that is the aorta, and the blood the other carried, that is the pulmonary veins, though we have just seen him saying much the same thing himself. In fact our knowledge of the very important work of Erasistratus in anatomy is very much confused, even the little we have, by the hostility of Galen, by far the most fertile source of our knowledge of it, due chiefly to the opposition, which Erasistratus headed, with very vulnerable arguments, against the practice of venesection. We know, however, that Erasistratus's idea was that what we call bloodvessels of the lungs are not bloodvessels at all but communicate directly with the air channels and draw from them the air which, thus going to the heart, is distributed through the aorta and the bloodvessels to the general system. The root of the word aorta in Greek we might be disposed to seek for in that of air, but that does not seem possible. Nevertheless it was a word originally applied to bronchial structures and in the oldest Greek writers may be found thus used, Aristotle first identifying it with the vessel which now is its sole application, but it is interesting to know that it came to it from the air channels of the lungs. It is not the place here to try again, as I have in a number of essays endeavored to do elsewhere, to show how attractive and plausible the pneumatic theory, which captivated Aristotle and Erasistratus and many of the other best minds of antiquity, was. Suffice it to say we have largely replaced the pneuma, materialists as we are, with the matter of fact oxygen which is derived from the air through the lungs and goes along everywhere with the blood to refresh and strengthen the bodies of the vast majority of living things.

Incomplete and superficial as is this reference to the physiological and anatomical conceptions of Galen in regard to the thoracic contents, we must now follow him upward in his understanding of the air passages and the specific instrument of the voice. But before we leave the lung one more quotation will reveal the difficulty Galen had with the anatomy of Erasistratus in one respect at least. Galen was sure and could prove it by experiment that the peripheral arteries contained blood but he could not entirely cut loose from the theory of the pneuma, indeed who can, even today? He could not get away from the pressing conviction of antiquity that there was something in arterial blood which did more than give it a redder color. The pneuma must be there and evidently in the lung something did happen to the blood and Galen, no more than Aristotle, could not make out where the air tube left off and the blood tube began. Egyptian anatomy formed a tradition both for Aristotle and for Erasistratus; they were coterminous and there was no blood in the arteries. No more than the Egyptians or Aristotle or Erasistratus did Galen know anything about the diffusion of gases, exosmosis and endosmosis and differentials of absorption, but he denied this for the general circulation. Doubtless they had all seen capillary attraction but knew not the capillaries. They had to go back to Empedocles for the conception of attraction and repulsion and for two thousand years it has clung as a support to his simile of love and hate, as though that explained anything, for who can account for antipathies?

Why, I cannot tell
But I do not love thee, Dr. Fell.

Ah, indeed, and who after all can tell what attraction and repulsion is even outside of the tender passion? But not to wander further from the subject, Galen (11) remarks that behind where the glands project into the cavity of the thorax the windpipe "is there divided and proceeds to all parts of the lung with the vessels which come from the heart, distributed to all its lobes"—this is the Aristotelian anatomy. They must run side by side, that is what makes it so hard to see they are coterminous, is probably the thought of Aristotle, for he goes it blind finally and says: "the trachea is also united with the great vein and with the part called the aorta" (3). Galen insists "it is only in the lungs the tube is entirely free of blood." Occasionally a little vaporous blood is seen in it "but the aspera arteria is entirely free of blood when the animal is normal." It must be confessed with the old Egyptian tradition weighing one down here was a difficulty indeed, the blight of theory.

No doubt it was with a sigh of relief Galen leads away from the subject upwards to our territory; "why is not the windpipe all of it cartilaginous or all membranous by nature, but alternately cartilage and membrane? Why are not the cartilages themselves perfect rings, but each lacks some small portion of it? With this I shall busy myself. First of all it is the function of the cartilage to act as a vocal instrument (12). . . . it is not every stroke of the air is able to produce a vocal sound, but there has to be a certain symmetry and arrangement of the vibrating substance and of its resistance also, whereby the air meets with more or less prolonged opposition, so that it does not collapse, its resistance being overcome." This resistance Galen subsequently explains is furnished by the muscular closure of the glottis. Now when Galen begins to talk about the vibration of the trachea in voice production, we know at once he is on the right track of course but that he is going to miss the significance of the vocal cords when he comes to the larynx. He knows all about the waves of sound from the old Greek nature philosophers, as when you throw a stone into a duck pond, so the ear by the incidence of the air produced the sound. Alcmaeon knew what it was and its effect when it struck like the plectrum of a bell on the hollow bones of the ear, some seven hundred years before Galen was born perhaps. Galen knew something had to vibrate but in going up the air tube from his troubles in the lungs he was a little premature and found the wrong thing doing the chief instead of the lesser "vibrating," and he gets into fresh trouble. "The cartilages in animals," he says, "assume this symmetry in such a way that when less resistant than they are ordinarily, through their laxity, they set the air itself more gently in vibration; when more firm they easily cause it to rebound so that it does not spread out nor resist the impulse received, but is cast upward and flows out in a manner similar to a current rather than to a gust and thus exhibits the effect of its energy." There is nothing very wrong about this except he has set the wrong structure to do all the vibrating.

Much more correctly even than is found ordinarily in modern textbooks as to its function he nevertheless overstresses the part the trachea plays in voice production, its lengthening and shortening, its dilatation and contraction. We have also been led astray by the interest the complicated laryngeal mechanism has aroused in our minds to neglect the part played in voice production by the tube below the rima glottidis. The cartilages of the tube, resonant, flexible, elastic, engaged the attention of Galen more than intra and extra laryngeal muscles and ligaments in voice production. "Its cartilages are the instruments of the voice itself, the bands that bind them together those of respiration. Moreover, that it is the cartilage is the prime instrument of the voice, the larynx is especially a document of proof to thee; that I have already shown in my book on the voice (which is lost) is the chief as it is the first one and that it is unnecessary that it should be all one cartilage is apparent to any one." . . . The trachea first assembles the sound and prepares it for the larynx and the palate like a kind of gong or reverberator resists the voice and the uvula, like a clapper, swells it.[1] "Not simply in expiration is the voice formed, but yet the blowing of the air is the real substance of the voice and in its way of working it differs from expiration in breathing although the muscles of the thorax cause that too. That has its own method of action and so especially does the voice." He again speaks of the trachea and declares it is the immovable state of its cartilages has to do with voice production and it is their motion has to do with respiration. In Cicero we get the idea that the teeth took the place of chords in string instruments producing sound, in ancient thought (16).

This resonance idea we see prominent in the way he treats of hoarseness—destroy the cartilage and it supervenes at once, despite the soft parts are left intact. He does not primarily say, cut the ligaments or muscles and the voice is lost. It is a framework matter chiefly for him. It is the differentiation in the relative prominence of parts of the ancient thought as contrasted with those of the modern to which I wish to draw your attention and then I want to show how much that depends on the ideas which run underground through the minds of men who have no or only the remotest connection with medical thought in general. We are always failing to realize how much we depend on humanity in the mass for our opinions and we are continually laying the flattering unction to our souls that we direct and do not follow popular currents. Galen no more misses the moving and moveable laryngeal parts than we entirely neglect the resonant parts of the organ of voice which lie below the rima glottidis. When an outsider, when Garcia showed us the workings of the vocal cords we fell into line with a sentiment, which overshot the mark.

But in the days of the ancients the importance given to the length of the trachea pervaded the lay mind and we find it formulated in the resonant lines of their poets. The swan sang its death notes and imagination made them sweet, imagination pure and simple as any one can testify who has ever heard a swan squawk. Such an one will ever remain unconvinced their notes are melodious in the article of death. For Homer the cranes, which flee from the coming winter and sudden rain, fly with clamor towards the streams of ocean (*Iliad* III.5). The magnificent lines of Virgil (17) have been translated by Glover with scarcely less splendor:

> Like snow white swans in liquid air,
> When homeward from their food they fare
> And far and wide melodious notes
> Come rippling from their slender throats
> While the broad stream and Asia's fen
> Reverberate to the sound again.

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[1] I make my own interpretation of this part of the Greek text as that of neither Kühn nor Daremberg is here very satisfactory, but I imagine it is the thought as well as the language of Galen is here obfuscated.

Now all this was because swans and cranes had long tracheae and Galen, referring to Hippocrates's description of the voice in certain morbidly dry states as clangorous, repeats the line in Homer I have quoted and says: "thus it is in all animals who have long necks and dry cartilages, of which kind are the cranes." I do not know what his opinion was of the singing notes of the giraffe, which Cæsar first showed at Rome in his triumphal games.

I should perform a tiresome service were I to point out how much less of the ligaments and nerves and muscles of the larynx Galen knew than we do and I am poorly adapted to such anatomical criticism, owing to my far flung and deep extending ignorance of modern anatomy, and I flatter myself I am performing better service and a more interesting one in thus laying emphasis upon some of the causes of the variations of much in the Galenic physiology and anatomy from our own. This I take it is a part of that psychology in the history of thought which it is absolutely necessary for the future historian of science to lay bare before us. It can only be a trifle in a special field such as ours but it will serve in illustration and it is neither useless for us to mark it nor is it entirely devoid of casual interest to go beyond the special field in trace of it, though the teleological bias is there also sufficiently obstrusive. The tracheal tube is not only long and therefore must be superior in sound production, but the tracheal cartilages are hard, oval and arched in front to act as bulwarks to external violence and spanned behind by soft resilient contractile bands to allow deglutition to take place without disturbing the essential parts of the vocal function of the trachea, which for Galen bulks so large in voice production, so all wise, so skilful is the Creator of all things, for we must not forget that Galen, like most successful practitioners, was a pious man. How else could God have made it better? Did Epicurus and Asclepiades think they could have made a better job of it? This great book of Galen on the Utility of the Parts he declares is largely written to demonstrate the wisdom and glory of God, and with this statement we get another line on the psychology and the mentality and the methods of thought of the author.

The anatomy of the larynx as set forth in the works of Galen doubtless represents an advance over that of his predecessors. When we come to that part (13) of it dealing with the cricoarytenoid and cricothyroid articulations the translation of Daremberg departs so widely from the text and translation of Kühn that we must surmise a fuller text was at the service of the former than Kühn used. Even the latter does some violence to the text he furnishes, which results in a stretching of the knowledge of Galen at this point. The text as I read it says the two cartilages, the thyroid and the cricoid quite evidently, articulate with one another aslant or obliquely, but Kühn translates it (*dearticulantur autem et committuntur inter se partibus obliquis*) "with oblique parts," which may mean oblique surfaces or oblique fibres of the cricothyroid muscle, but does not surely mean one or the other as it stands in the text. Daremberg; however, says, "they articulate one with the other upon the side by an arthroidea by means of the small horn of the thyroid and the articular apophysis of the cricoid." (*Ils s'articulent l'un et l'autre sur le coté par arthrodie au moyen de*—etc., etc.) Now I am not a paleographer and I would not enter into this discrepancy were it not that it seems as though, if Galen had in his mind as sharply defined as the translation of Daremberg indicates the anatomical relationship of the parts, he would be on the track to a knowledge of the physiology of the vocal cords as we understand them and even the latitude of Kühn's rendering suggests the same. It is true the text here is not very satisfactory for as it goes on to the arytenoid joint it defines the articular surface as convex at the point "where the cricoid leaves off." Daremberg intercalates certain words in brackets which do not exist in Kühn's Greek text of Galen but which are to be supposed to represent Daremberg's conception of the meaning of the passage, and so far as the warrant of the Kühn edition goes he transgresses still more seriously by not including still other of his own ideas in brackets. The result is, when the reader compares the two translations, the Latin of Kühn and the French of Daremberg, with one another and then compares them each with Kühn's Greek text, confusion reigns.

As I have said, I am no paleographer and I am not much of an anatomist, but I cannot but help wishing some one combining the two qualifications would treat the various texts of Galen at this point, if at no other, as the importance of it in the history of laryngeal anatomy demands. Then Kühn's text and translation passes on to speak of the cricoarytenoid joint. On the cricoid "there lie two small convexities." Here therefore begins the third cartilage (the arytenoid, Galen's number for the laryngeal cartilages was three, the arytenoid being a single cartilage with two articular surfaces at its base) having cavities exactly fitting the latter eminences so that the meeting of these two cartilages (the cricoid and the united arytenoids) make a double joint. Now this mistaken conception of Galen himself is perfectly clear and with those surfaces before his eyes or in his mind, with the arytenoids forming a single cartilage, there should have been for him no sliding joint and no swinging joint either, as Daremberg interprets him. No lateral folds of the mucous membrane even, if he made out the tendinous structures within them, could have had any significance for him. His book on the voice has been lost and we do not know how far in that he went in the anatomical and physiological description of the parts, but we have every reason to infer, with this fundamental error of observation, he could not have grasped the nature of intralaryngeal movements, yet he says, evidently referring to the lost treatise: "How first the voice may be formed in the larynx, how the latter is most dilated and compressed, opened and closed exactly above its orifice is shown in other writings." Kühn's translation is not very happy here either, but the necessary emendations, which a laryngologist can supply, are not great and do no violence to the text. Galen's conception of opening and closing the larynx is essentially a purse-string mechanism (14), and this seems all the more remarkable because his knowledge of the internal and external musculature and the membranous and tendinous structure was surprisingly extensive if not very accurate, but I have no intention of going into details. It is moved by twelve muscles proper to its structure, my notes on this part of his discourse say, so far as it has relation with neighboring parts by eight others. In animals with a loud voice he seems to think the arrangement if not the number differ a little, but after all he cannot get away from the pneuma. That the animal should produce a voice, the air must be set in motion with something more than a simple expiratory sigh, but at the same time the glottis must be made narrower and wider in the passage of the air through the larynx and in this act the muscles of the chest in the first instance and those of the larynx in the second place must be brought into play. However, I must leave Galen's struggles with the mechanism pure and simple of the larynx and pass to his great claim to our respect—his demonstration of the recurrent nerves.

The 14th chapter of the Seventh Book of the Utility of the Parts marks a great epoch in the history of our knowledge of laryngeal physiology (15), and one is infinitely amused to see how well Galen knew it and how his vanity swelled, burst and ran over into loud jubilations of self laudation. It is long drawn out and I cannot translate it all. It was too sweet a morsel for Galen to abbreviate and we must perform that painful task for him here: "Everyone will marvel if he will but lend his mind to what I have to say here . . . You must show yourselves more attentive than if you were taking your initiation at the Eleusinan or Samothracian mysteries or at any other great solemn ceremony of the kind, so great because of those things which are done and said by the priests. You will stand in wonder and think this is nothing inferior to those sacred things nor less indicative of the power, wisdom, foresight, and goodness of the Creator. Listen then to me, for I am the first of all to discover these sacred things. No one before me has perceived any of these nerves nor any of these things which I have found in the larynx as before described, their cause and their action. The anatomists have all erred and they have not touched upon a tenth part of them. Turn, therefore, if thou hast been lax before, and now at least be an attentive and worthy listener to what is about to be disclosed; follow my discourse setting forth the marvelous mysteries of nature."

The nerves in the time of Galen were not yet fully differentiated from the membranous and tendinous structures which on superficial examination they resemble. It is not altogether clear how much he had to do with this movement which probably was well under way when he began his studies. We find him seriously imbued still with the idea they have some mechanical action like a string on the muscles in which they end, an affinity still and sometimes a confusion with the tendinous parts of muscles at their insertion. As the recurrents curve around the great vessels this notion especially took possession of him as though thereby on the principle of the pulley they have a drag downward. Their oblique course, he thinks, saves them from the strain of the direct pull. In this connection he reminds the reader, nevertheless, of their origin in the brain or its prologation and that they do not come primarily from the heart, the center of all things Aristotelian. All muscles receive the nerve in their heads or near it, at least above the middle of the body. If in the center, as of the diaphragm, all fibres draw towards the centre. "This is common to all muscles and divisions (of the nerve), extend to that part towards which their fibres converge. If you keep this in mind you will be convinced, I think, why it is necessary for the nerves to be inserted in the laryngeal muscles from beneath. It will also be understood why the muscles that close and those that open the larynx need not be of the same size. The openers (postici) do not have to oppose the expulsory force of the thoracic muscles, considering which in their physiological rôle of voice producers he has considerable discourse, and because of the force necessary for the muscles closing the larynx it needs must be that the nerves should enter them in a straight line with their heads, since by means of the muscles the arytenoid cartilage is dragged upon" . . . If the nerves came from the heart, "as some think, ignorant of all things which concern dissection," this would be provided for by another arrangement, but coming from the head or spinal cord as all nerves do, they would enter from above downwards and obliquely, except that an all wise Creator took them into the chest and wound them around the vessels like pulleys, being as they are "branches of the sixth nerve," as he called the pneumogastric. "From the posterior part of the brain the derivation descends straight through the whole neck on each side of the aspera arteria, alongside of which there lie certain other small parts joined to it." There is no textual reason why he was not familiar with the relations of the sympathetic and the spinal accessory root, but it is not very easy to be sure we are not imputing more to his objective anatomical knowledge than we have warrant for. However, from this superficial and imperfect sketch, incomplete as it is and exhibiting only partially the enormous discrepancy between his knowledge and ours, in spite of our suspicion that much of his knowledge is derived from his predecessors and his contemporaries, we must recognize in Galen the first great expositor, if not the greatest expositor, of the anatomy and physiology of the organs of respiration and the voice, who has ever lived, at least of whom we have any knowledge.

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15. *Idem: Ibid,* VII, xiv, p. 567.
16. Cicero: *de natura deorum,* II, 59, 149.
17. Ceu quondam nivei liquida inter flumina cygni
Cum sese a pastu referrent et longa canoros
Dant per colla modos, sonat amnis et Asia longe
Pulsu palus. Aeneid VII 699-702.

The Establishment of a Temporary or Permanent Pulmonary Lip Fistula in the Conservative Treatment of Advanced Bronchiectatic Lung Abscess*

By WILLY MEYER, M.D.,
New York City,
Attending Surgeon, Lenox Hill Hospital.

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When the late much lamented chairman of your section, Dr. Henry L. Lynah, the consulting peroral endoscopist of our hospital, the Lenox Hill, of New York City, invited me to take the surgical part in the symposium on pulmonary abscess, which he had arranged for this meeting, I accepted without hesitation, as the subject is of particular interest to me.

After some deliberation as to what phase of the topic assigned to me I should bring out, I came to the conclusion to briefly discuss the Conservative Surgical Treatment of Bronchiectatic Lung Abscess.

Personally I feel inclined, from a mere clinical point of view, and aside from exceptional cases as actinomycosis, suppurating hydatid, and others, to divide nonspecific or subacute chronic lung suppuration into three classes:

1. The ordinary lung abscess, subsequent usually to pneumonia or influenza; 2, the typical bronchiectasis, viz., multilocular lung suppuration, due mostly to congenital origin; 3, the bronchiectatic lung abscess, consecutive to the aspiration of septic, semisolid, or liquid material, or also due to embolism of small size and a low degree of infection, both producing local gangrene. Each of these three classes requires different treatment.

Without going into the merits of the various more or less conservative procedures proposed for the treatment of lung suppuration, I would today present the result of personal endeavors made to relieve the bronchiectatic lung abscess, by incising the principal cavity of the lung, a procedure which naturally includes the attempt to reach a larger bronchus or its branches, for prolonged drainage, the latter to extend over many months or even years.

In some of these cases one larger, irregular cavity is present, or two (or more), sometimes smaller ones, communicating with each other and with that branch of the main bronchus, through which aspiration took place, and which is drained outwardly when the cavity is successfully reached and opened.

The endeavors just referred to resulted in the working out of a method which, it seems, often cures the active lung disease in a very simple manner, viz., by thorough, direct and prolonged drainage, and increased ventilation, secured by means of establishment of a temporary or permanent lung-lip fistula.

Before describing the method, I should like to give here a brief history of the events that led up to its adoption.

In the years 1908 to 1912, while doing experimental work on dogs at the Rockefeller Institute, we found that healthy dogs stood the removal of one or more lobes of the lung nicely, if operated upon under differential pressure and, of course, under strict aseptic precautions. They were almost well after forty-eight hours, jumping around and barking, as if nothing had happened. On testing the contents of the chest in the place of the removed lung lobe or lobes with an aspirator, we found air, never fluid, in contrast to the experience of Robinson and Sauerbruch, who always found fluid (1). I believe, with a perfectly aseptic course of healing after lobectomy in the healthy dog, with separate ligation of the bloodvessels that accompany the bronchus, and crushing combined with airtight inversion and suture of the bronchial stump, also complete closure of the chest, air will be found as a rule within the chest in place of the excised lung portion, and not serous fluid (2).

Of twenty-six dogs thus operated upon, twenty-two recovered or 84.6 per cent. (3).

Subsequent observations of the effects of lobectomy in dogs showed that Nature tries to eliminate the defect, created within the chest, by a gradual distention of the remaining lobe on the side operated upon, as well as of the entire lung of the other side (compensating emphysema), correspondingly changing the position of the mediastinum, diaphragm and chestwall itself. Whenever the entire lung has been removed, the opposite side crowded over, but the tissues did not become adherent to the other costal pleura; they formed a kind of new pleural cavity.

Anatomical proof of this work of Nature was made possible through the courtesy of Dr. Francis Carter Wood, of New York, who was good enough to give his valuable aid in these investigations. He bled to death the dogs treated with lobectomy, at various times after the operation under general anesthesia, through an incision in the femoral artery, then using this opening to inject a five per cent. formalin solution into the vascular system. After thorough hardening and freezing of the entire animal, transverse section cuts were made through the chest at various levels. The specimens thus obtained were very instructive. Some of them were shown before the American Surgical Association at its Washington meeting in 1910 (4). They are still in my possession.

Enthused by this favorable experience in dogs, we approached our first lobectomy in the human being with great hopes, on May 12, 1909. The case, a boy of six years, had shown the clinical signs of what seemed to be a bilateral bronchiectasis, concerning both lower lobes, of more than two years' duration. He had come under my care through the courtesy of the late Dr. Pisek, of the Post-Graduate

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Hospital. With the patient's head and the anesthetiser under positive pressure, within the cabinet—the only apparatus for differential pressure then available in science and at the Lenox Hill Hospital, outside of the negative chamber, which had not yet been installed—we loosened the adherent lobe and treated the pedicle, bronchus, and bloodvessels as we had learned to do it in our experimental work. Today we know that such detailed treatment of the stump is not advisable in human beings. After the vessels were doubly ligated and divided we crushed the bronchus with a powerful clamp and, just as we were inverting it, after tying, the anesthetiser informed us that the patient's pulse had suddenly become weak and respiration very superficial. Soon the heart stopped beating; persistent attempts at resuscitation failed. We all were utterly disappointed and unhappy, and tried to explain our experience in various ways: Acute dilatation of the right heart on account of the continuous increased air pressure, in the face of a heart muscle, weak and diseased from years of septic infection, vagus reflex, and so forth.

The experience just related occurred a few weeks before the arrival of Dr. P. Friedrich, then professor of surgery at the University of Marburg, Germany, who had come to America in the spring of 1909, at the invitation of the American Medical and the American Surgical Association, to attend their annual meeting. On discussing the boy's death with him he gave me the following advice: "Do not attempt to excise every chronically suppurating bronchiectatic lung lobe in the human. Lobectomy is still a very serious operation, and thoracic surgery is still a very young child. The many deaths that would most likely result, might give thoracic surgery a black eye in the estimation of our medical brethren. Rather go ahead slowly and cautiously and try conservative methods first."

I took his advice and, in the course of the subsequent years, conscientiously and faithfully tried every conservative procedure known in the surgical treatment of bronchiectasis: artificial pneumothorax, collapse of the chest wall by the socalled extrapleural thoracoplasty (multiple rib resection), ligation of a branch of the pulmonary artery with and without subsequent thoracoplasty; incision of the lung with drainage, and, resection of the lung, lastly, bronchoscopic treatment at the hands of experts.[1]

One of the results of my attempts to help some of these seriously afflicted patients in a more conservative way was, as mentioned above, the working out of a method which promises satisfactory results in a more roundabout fashion in patients suffering from the socalled bronchiectatic lung abscess, though it will naturally not cure the patient as completely as the excision of the diseased portion or portions of the lung. It consists, in brief, in the establishment of a pulmonary lip fistula, which, after the principal cavity is emptied of its contents: pus, old fibrinous coagulations, and grumous material, ventilates the same directly; and this, interesting to observe and to state, does away definitely with that terrifically foul odor of the sputum. As I have frequently stated when presenting such patients before medical meetings, it is evident that the free access of a larger volume of oxygen to the evidently partially anaerobic microbes, which settle down in these cavities and are, I believe, responsible for the terrible odor, destroys them permanently. Repeatedly I have succeeded in hastening this happy change by making the patient close his mouth and compress the nose, thus forcing respiration through the artificial opening, often also having the nurse blow a stream of pure oxygen gas into the fistula several times daily, with inspiration through the same on the part of the patient. The sputum, too, ceases after a while.

When the patients have recovered and been discharged from the hospital, they appear perfectly well. In case of a severe cold, or of undue, and, of course, forbidden, exercise (bicycle riding, dancing, playing tennis, or other violent exertion) temporary exacerbation may set in later on with accompanying cough and reappearance of sputum which is often streaked with blood, and mild fever. However, these phenomena are only temporary; the patients soon regain their former greatly improved state; they are able to work, their weight increases; bachelors even get married, and usually they are so well satisfied with the improvement attained that they refuse the second part of the work planned: the closure of the canal or opening. So far I have had no chance to attempt closure of the lung fistula, which, I think, would best be done by means of a circular excision of the skin lip fistula, cauterization of the canal that leads into the lung and collapse of the chest wall by means of extrapleural thoracoplasty. In two of my patients this lip fistula has closed spontaneously; both are completely cured.

Of course it must not be forgotten that so long as the canal remains open these patients cannot be considered cured in the true sense of the word. They cannot take a bath, even in the tub, or go in swimming, nor must they ever fall into the water, for instance, while out fishing. Instantaneous death by flooding the lung would be the consequence.

It is true it might be possible to close the opening with a cork and in addition construct a snugly fitting, safe suction rubber cap, with inflatable neck, as we see it attached to the masks for general anesthesia, to make the fistula airtight. Still, with their body immersed in water, their life would depend on the proper working of such a device. The slightest leak, and they would drown instantly.

There can be no question that extirpation of the affected lobe or lobes is the best and the most radical surgical treatment. If the patient pulls through the operation, he is completely cured of his terrible affliction. In the pronounced type of congenital bronchiectasis, also in advanced acquired multilocular cavity formation of the lung, resection is the only operation that comes into consideration.

On the other hand I am convinced that there are many weak and reduced patients with acquired and advanced chronic nonspecific lung suppuration, particularly the bronchiectatic pulmonary abscess, in whom radical work is absolutely contraindicated, who would succumb to the extirpation of the diseased portion of the lung. In other cases the radical operation is refused by the patient or his relatives.

In such instances it is important to know that a less severe operation can bring some of these patients back to a very satisfactory state of health, even to complete cure and restore them to useful membership in the community.

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[1] I did not try the subdiaphragmatic transposition of the affected lower lung lobe, in combination with and rendered possible by artificial paralysis of the diaphragm on the same side, by means of phrenicotomy, as proposed by Henschen, as not much is known about this procedure so far.

In conclusion, I would again emphasize that we are just entering upon this new and last chapter of operative surgery, viz., thoracic surgery—that we are still groping our way in trying to establish indications as to which one of the various useful operations should best be selected for the case in hand.

One word to our friends, the radiographists. It is true they have already done a great deal in assisting the surgeon in locating the principal focus within the large thoracic cavity. Once Dr. William H. Stewart, the radiologist of our hospital, stated in his report: "Measure eight inches down from the spinous process of the seventh cervical vertebra and from there two and a half inches to the right. If you plunge your aspirating needle at this place, you will find the abscess." I followed his instructions and struck the pus. But this remained an isolated, exceptionally fortunate occurrence.

The radiographists should develop their branch of our science still further. They ought to furnish the surgeon with still more explicit data than their fascinating stereoscopes reveal. We need more detailed information, so essential for operations on conservative lines, regarding the actual distance of the principal focus from the front as well as the back and sides of the chest; we ought to be able to guide our aspirating needle by their advice, in which intercostal space we should enter, whether we should push the needle forward in a straight sagittal line, or in an oblique direction and so forth.

But our principal efforts should turn in the direction of avoiding the development of this dreadful disease—in the direction of prophylaxis. We know that aspiration of foreign substances, solid, semisolid, and liquid, represents the most frequent cause for the development of this trouble. Let the physician remember that the sudden onset of an unusual cough points to such aspiration, and demands the immediate calling in of a trained bronchoscopist for consultation, besides taking an x ray picture of the chest; let the specialist arrange his tonsillectomies and adenoidectomies in such a manner that aspiration of blood, mucous and septic material can not and will not occur; and let the surgeon bear in mind, should he be called into such a case early, a number of days after an operation, when the incessant cough with foul expectoration and high fever has just begun, I say, let the surgeon bear in mind that surgical interference of any kind inclusive of the establishment of an artificial pneumothorax, is not indicated as the first step, but that a trained bronchoscopist is also his best friend.

In the spring of last year such a patient came under my care. Fourteen days before, her tonsils had been removed under general anesthesia, at another hospital, up to which time she had been perfectly well. She now suffered from a most distressing cough, day and night, neither medicine nor therapeutic procedure of any type bringing the slightest relief, with a terribly foul and massive sputum and fever up to 104°, the typical picture of a socalled aspiration pneumonia with incipient lung suppuration. Having previously often discussed this very picture in its first development with our departed friend, Dr. Lynah, holding that this would be the time for bronchoscopy and thorough aspiration, irrespective of fever and the patient's general condition, I called him in consultation. He promptly did his wonderfully dextrous endoscopic work, and after a few days cough and sputum had ceased as by magic and the fever had dropped. The patient was the happiest woman in the world, and we were all equally delighted. I begged her to stay in the private hospital at least one week longer for observation, and, if necessary, have Dr. Lynah repeat bronchoscopy with aspiration. But she left, considering herself perfectly well. I then lost sight of the patient and was unable to locate her, in spite of careful search, until, a few days ago, through our faithful social service nurse, the patient was found. She was entirely well, had no cough, no sputum, and expressed her gratitude for the splendid treatment she had received at the hands of Dr. Lynah.

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Some Principles of Immunology Applied to Treatment by Artificial Pneumothorax*

By NATHAN BARLOW, M.D.,
New Haven, Conn.,
Surgeon (Reserve), United States Public Health Service.

The results of artificial pneumothorax in properly selected cases are usually gratifying, and in some cases almost miraculous, considered with reference to the period of time immediately following the treatment. Let us consider the reports of ultimate results by experienced men who have followed their cases over long periods of time, and whose papers bear evidence that all patients who have dropped the treatment for any reason (those who have developed complications which eliminated them, those who fell into special classes for any reason and all classes of irregular cases) have been included in their series. Of those in your own immediate vicinity, Minor (1) reports twelve and a half per cent. of permanent recoveries, Ringer (2) reports thirteen per cent. permanent recoveries, and in the literature, generally, but few report more than twenty per cent.

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of cases in which long continued arrestment has been attained. These reports are by men of seasoned judgment, who are able to justly apportion the credit which is to be given the treatment, and who have recovered from the first enthusiasm aroused by a new treatment.

A general review of the literature makes it evident that the victims of tuberculosis have on the whole been benefited by the introduction of artificial pneumothorax, but the permanent benefit received is disappearing for a treatment which, when first applied, produces so marked and prompt a change in the condition of the patient. In this paper I will endeavor to show that much better ultimate success could be attained if it were not for the failure of the physicians using this treatment to recognize certain principles which should be applied in the care of the patients. These principles are partly immunological and partly mechanical, the first group being the most important.

Of the biochemical processes taking part in the resistance of the body to tuberculosis, the following three will be considered. Each of these is a group of reactions, and not a single process:

1. Local resistance to invasion. This includes both the power of the cells of a particular region (the tubercle and its vicinity) to withstand or destroy poisonous products of either the bacilli or the tuberculous tissue, and the allergic tissue response which causes the hyperplastic wall of defense to be built up.

2. General antitoxic immunity: This includes the reactions by which the body destroys, neutralizes, eliminates and withstands the poisonous products which are produced by the bacilli and by the tuberculous tissue, and which reach the general circulation. It should be remembered that a toxic substance is not necessarily a toxin proper, and that the expression antitoxic immunity makes no assumption as to the nature of these toxic products. The antitoxic immunity is measured by the amount of these toxic products which the body can endure without constitutional symptoms, apparent injury to the tissues, or apparent interference with function.

3. Metabolic processes: All the reactions of resistance are metabolic in their nature, and require expenditure of energy on the part of the cells of the body which take part in them. Demands are therefore made upon the nutritional and eliminative functions in excess of the basal requirements of the body. In these, as in all metabolic processes, there are required certain special substances, some of which are elaborated in the endocrine glands and some probably elsewhere, the supply of which is not unlimited. These unusual demands do not cease when resistance is established, as the replacement, elimination, and repair of diseased and necrotic masses of tissue continue to tax the reparative power of the body.

The local resistance to invasion is by no means equal in different parts of the same animal body. Wassermann and Citron (3) have shown for typhoid bacilli that the bactericidal immunity is greater in the location in which the immunizing injection was made. Roemer (4) has shown the same with reference to the antitoxic immunity against abrin. Von Pirquet (5) has shown that the allergic skin reaction is greater in a region frequently used. We are all of us familiar with extensive tuberculous lesions which for long periods seem to progress only in certain areas, usually those last invaded. By analogy with every immune process with which we are familiar, we are driven to the conclusion that the tissues in the immediate vicinity of the most recent lesions, and which have been subjected for the shortest time to the action of concentrated toxic products, must, within certain limits, have the least welldeveloped resistance.

In the artificial production of immune reactions of every sort, we must begin with small doses of the antigen (toxin, bacillus, protein, or whatever substance we are using). With gradually increasing and properly spaced doses, the degree of the immunity is gradually raised, but if doses which are too frequent or too large in proportion to those against which immunity has been established are used the resistance is overwhelmed, and the result is injury to the animal, and decrease instead of increase in the immunity. There is every reason to believe that the local resistance against tuberculosis follows the same laws, and that it may be diminished or destroyed in the region of a very active tubercle, and yet be efficient in the neighborhood of older and less progressive lesions. In practice with patients who are not receiving pneumothorax, we base our treatment, not upon what we find in the oldest and most advanced lesions, but upon the turn of events in the most recent extensions. Why then should we assume that as soon as we have induced pneumothorax, all of these laws are reversed, that progress in one part can not take place unless the disease is everywhere progressive, that the local resistance in the collapsed lung is immediately raised to a perfect degree, that advanced caseous lesions can heal and cicatrize in a few weeks, and even that signs of pathological activity in the uncompressed lung can be disregarded, signs which would cause us grave concern if we discovered them in one of our other cases. I have seen patients who had been discharged from sanatoria with both physical and x ray evidence of advancing disease in the uncompressed lung, although with almost no clinical symptoms; apparently in this same blind faith that artificial pneumothorax alters or even reverses all of the clinical, immunological, and pathological laws that govern the course of tuberculosis.

The general antitoxic immunity and the local resistance to invasion are ordinarily more or less proportioned to each other. In clinical terms, the symptoms usually correspond in a general way to the rate of extension of the disease. But we are all of us familiar with cases in which this correspondence does not hold good. We frequently see wellnourished, afebrile patients in whom the disease is steadily progressing; although we know that sooner or later, if the disease is unchecked, the constitutional immunity to the poisons of the disease will break down, and the condition of the patient become similar to that of the usual far advanced case. All of us who have used tuberculin in treatment know that tolerance to relatively large doses is readily attained, even though the disease may be unchecked in its course. Dr. Dorset (6), of the Bureau of Animal Industry, has found that tuberculin tolerance may be established in cattle without interfering with the ophthalmo reaction, and that when slaughtered, these cattle show no evidence that the tuberculous process was in any way altered by the antitoxic immunity against tuberculin. DeFosset (7) reports that cattle may be apparently healthy and tolerant of tuberculin, and yet respond to the ophthalmic tuberculin test and show well marked lesions of disease when slaughtered. It is clear that the general tolerance is similar to the desensitizing immunity established against anaphylaxis by any foreign proteid, when proper doses are administered. It is a reaction to which many tissues contribute, its development will therefore be proportional, up to a certain point, to the amount of these poisons (antigens) which reach the general circulation. On the other hand, the tissues immediately adjacent to the tubercle have for a long time been receiving more than the optimum stimulus, and the fact that the disease is progressive shows that they are incapable of responding sufficiently to meet the requirements.

The degree of antitoxic immunity (tolerance) is determined by the dosage of toxic products (antigens). If this daily dose is large, and the body can take care of most of it, so that there are but moderate symptoms, we must expect that any marked reduction in the amount reaching the circulation will be signalized by a disappearance of the clinical symptoms which are due to those poisons. We see this illustrated in the far advanced patients who have been ambulant before entrance into the hospital, and have therefore been inoculating themselves with enormous doses of these tuberculous products. After being placed at rest, they not infrequently have an afebrile temperature as long as they remain in bed, even though their disease is advancing more or less rapidly. Of course the least exercise causes an elevation of temperature, but under the conditions of complete rest, their general antitoxic immunity is adequate to prevent fever, although their local resistance to invasion at the sites of the lesions may be almost nil.

A much greater reduction in the amount of toxic substances reaching the general circulation is brought about by artificial pneumothorax. During the period immediately following its production the collapse of the lung presses out a certain amount of lymph which bears toxic products, and during this period the temperature is often increased. This gradually becomes less, the rate depending upon the manner of treatment as well as upon the pathological condition present, until finally the complete rest of the diseased lung reduces the amount of toxic material reaching the general circulation to a fraction of that which previously escaped from the lesions. This is followed by a return of the temperature to normal, and by a disappearance of most of the symptoms usually regarded as evidence of toxemia. But this reduction of clinical symptoms is due to the reduction of the amount of toxic substance in the circulating blood in a patient with an antitoxic immunity of the degree produced by the previously very much larger dose. It is not due to healing of the lesions themselves, and bears no relationship to the local resistance of the tissues surrounding the lesions. It is true that the tubercles are now in a position more favorable to healing because they are situated in a tissue which is at rest, but there will be the same conflict between the forces of repair and the forces of destruction, as there is in any tubercle situated in some other organ than the lungs. Artificial pneumothorax is usually performed in advanced cases with numerous large tubercles and caseous foci, and often with chronic fibrocaseous lesions in which the tendency to rapid healing is reduced. Such lesions in any part of the body would require months of the most rigid treatment, followed by months or years of careful supervision to effect a cure. And yet after the performance of artificial pneumothorax, such patients are sent to their homes after a few weeks of treatment, allowed to resume their occupations, and the only injunction laid upon them is that they return regularly for their infection. Artificial pneumothorax does not alter the laws of nature, nor does it take one jot or tittle from the necessary steps in checking the progress or in the repair of pathological processes.

The antitoxic immunity is of course subject to a gradual reduction in degree following the reduction in the amount of circulating antigen. There are no accurate observations as to the rate of loss of tuberculin tolerance, but experience derived from tuberculin treatment shows that it is safe to begin with a reduction of twenty-five per cent. after eight or ten weeks of cessation of treatment, and with a fifty per cent. reduction after many months. Krause (8) reports the persistence of congenital sensitiveness in a guineapig after 404 days. As the amount of toxic substance in the circulating blood after a complete collapse must be a small fraction of that present before, it is clear that there must be a very marked increase in the disease before this amount will again rise above the threshold of the quantity necessary to produce clinical symptoms. The clinical guides to treatment are therefore entirely misleading after the induction of artificial pneumothorax. We can not expect clinical evidence of activity until extension of the disease has reached a dangerous or even hopeless degree. We should therefore treat patients under artificial pneumothorax with reference to the pathological condition, and not according to the indications which the clinical symptoms would afford us in uncompressed cases. We should consider even the slightest clincial symptoms as of grave import, and should remember that we may have extensions with almost no symptoms. This does not mean that we should treat such cases with the same régime and for the same length of time that it would take to heal the same pulmonary lesion if uncompressed. A better rule would be as follows: Give every patient under artificial pneumothorax a course of treatment which would probably result in the arrestment of a surgical tuberculous lesion equal in extent to the compressed lesion, with pulmonary involvement equal in extent to the lesions in the uncompressed lung, plus the ineffectually compressed lesions which there may be in the treated lung. Pay no attention to absence of fever or gain in weight or strength, but give the same preliminary complete rest, and the same gradual increase of exercise that you probably would in the hypothetical case, which would of course show clinical symptoms at a much later date than does the real case.

The demand made upon the metabolic processes requires special consideration for several reasons. The patient has been for some time suffering from the toxemia of advanced tuberculosis, with the consequent degeneration and weakening of the heart, digestive, secretory, and other organs, and is scarcely able to meet the metabolic requirements of normal life, entirely apart from the requirements of repair. This degeneration and weakness is not recovered from in a few weeks or even months, and it would be poor practice to allow a patient with an equal grade of debility and neurasthenia to return to any occupation until after full recovery, even with no tuberculosis. By contrast with their former condition, these patients feel that they are well, and are likely to neglect the signs of weakness and fatigue which a normal man would heed, especially as to confess them is to admit to their associates that they are still tuberculous. The removal of waste and fatigue products makes demand upon the same metabolic forces as do the processes of repair, forces which are almost too weak, and whose necessary materials are present in almost too small quantity to cope with the great demands made upon them by the removal and replacement of the extensive diseased tissue. There is competition among the tissues of the body for their necessary repair. The healthier cells are stronger, and the brain and muscle cells will make their demand felt first, then the somewhat weakened heart and abdominal organs, then the tissue around the less active lesions, and lastly, the tissue around the most active tubercles, which is most poisoned. This order is of course modified by the physiological precedence taken by tissues of vital necessity such as brain and heart, when any constituent is deficient in the body. But the first to suffer will be the tissues which surround the most recent and active lesions, the very points where resistance is weakest and where need is greatest. The bodily activity of the patient should therefore be kept at a minimum until sufficient time has elapsed for the physician to believe it possible that reasonably secure healing has taken place around the most recent lesions.

MECHANICAL CONDITIONS AFFECTING TREATMENT.

A complete and symmetrical pneumothorax can rarely be produced. With such a pneumothorax, the entire lung is collapsed into a small kidneyshaped mass situated near the hilum, and of a perfectly regular outline. If a compressed lung still extends to either the diaphragm or apex, or if its outline shows irregular projections, we may be very sure that there are adhesions which prevent collapse. Such adhesions must bear the entire elastic tension of that part of the lung, and it is evident that even slight respiratory movements must greatly alter the tension of the tissue making up the band of adhesions. Tuberculous lesions immediately adjacent to such adhesions are therefore apt to be placed, by the induction of the pneumothorax, under conditions more unfavorable to local healing than they were before. We not infrequently see cases in which the pneumothorax is complete except for adhesions to the diaphragm and near the apex or shoulder. Adventitious sounds are usually heard at the site of these adhesions, and are often explained as pleural frictions. Such adhesions are always under tension and present rounded angles, with the pleural surfaces nowhere in contact; how friction sounds can be produced is difficult to understand. It is much more probable that such sounds are atypical râles, that they indicate that the pulmonary tissue near such adhesions is still being subjected to such violent stresses that râles are produced in spite of the collapse. It is easy and pleasant to ascribe such sounds to adhesions, but a careful scrutiny of stereoscopic x ray plates will, in many instances, show that it is absolutely impossible for friction sounds to be produced in that particular locality.

Owing to the lack of expansion of the collapsed lung, and to its distance from the chest wall, all of the physical signs of disease obtained by percussion or auscultation are suppressed excepting in adherent areas, and the impression given by physical examination is that of complete absence of so-called active disease. Even if actual extension of the disease should take place, we could not detect it by physical examination of the compressed lung. The physical signs have not disappeared on account of the cure of the disease, they have merely been suppressed. A suppression of the physical signs of progressive disease also takes place in the opposite lung, and we regret that the causes of this suppression are usually overlooked in textbooks and special articles dealing with artificial pneumothorax. These causes act in any case in which one lung is limited in its function and the other is compensating, and a recognition of this suppression of physical signs in the compensating lung will sometimes aid us in avoiding mistakes in the treatment of such cases.

It is generally recognized that a compensating lung is hyperresonant. Regions of moderate infiltration are so expanded that moderate dullness may become but slightly impaired resonance, and owing to the greater tension of the tissues, percussion over this slightly impaired area may elicit transmitted resonance from other parts, so that the region may appear to give a normal percussion note. The harsh and exaggerated breathing heard over a compensating lung obscures all but the well marked changes in the breath sounds. Râles are reduced in number or entirely suppressed in a compensating lung; in other words, it requires greater pathological activity in a lesion to produce râles in a compensating lung than it does under ordinary conditions. There are two reasons for this, and they deserve careful explanation and consideration on account of the great importance of the fact. Under ordinary conditions, the diseased regions are breathing to the minimum extent which the reflexes of the body can accomplish, certainly much less than under normal conditions. The compensating lung is fully expanded in every part and breathing at its maximum efficiency. The tidal exchange of air, and therefore the drying of the surfaces of the airspaces, is much greater in the lesion in the compensating lung, and moisture must therefore be exuded at a more rapid rate before râles are produced. The increased flow of blood through the compensating lung, and the increased lymph flow promoted by the increased respiration, both tend to remove poisonous substances more rapidly from the vicinity of the tubercles. We all know that râles are produced, not in the tubercles, but in the inflammatory zone immediately surrounding them; not by the tubercle bacilli, but by the poisonous materials elaborated in the tubercles. If these poisonous products are washed away at a more rapid rate, they must be produced at a more rapid rate in order to maintain enough inflammatory reaction to produce râles.

We must therefore consider that slight physical signs in a compensating lung have many times the significance that the same signs would have under ordinary conditions, and that in such a lung lesions may be present without râles and yet with a degree of pathological activity which would give abundant evidence of moisture in a lung not compensating.

Even the x ray plates are deceitful in case of a compensating lung. The hazy markings and faint clouding upon which we base our opinion of the earliest pathological activity often depend as much upon the partial atelectasis always present in infiltrated regions, and upon the increased moisture of such lesions, as they do upon actual cellular infiltration. In the fully distended and relatively dry compensating lung, it requires more cellular infiltration to produce the same haziness or clouding. In other words, a lesion must be more progressive or more advanced in a compensating lung before it will produce the appearance which the röntgenologist recognizes as indicating socalled activity.

We have seen that both the clinical symptoms and the physical signs are suppressed by artificial pneumothorax to such a degree that they do not even indicate any activity whatever in many cases, and that there is even a reserve of suppression, so that the disease can actually advance to a considerable extent before either clinical symptoms or physical signs will reappear. Almost all of us base our treatment largely upon certain clinical symptoms and physical signs. Some of us rely upon temperature, some upon weight, some upon râles, some upon pulse rate, some upon x ray plates as the chief criterion, of course considering all of these and other indications. But all of these are rendered worse than valueless by artificial pneumothorax; they are made deceptive and misleading. It is but natural that the custom has grown up of treating the patient according to the apparent indications, which means that in a few weeks or months he is allowed to leave the sanatorium and report for treatment. He usually resumes his part in ordinary life in a very short time, and we even read articles upon artificial pneumothorax in which the writers take great pride in the short time in which far advanced cases were returned to gainful work. Such cases are being treated, not for tuberculosis, but for pneumothorax. In many of them the untreated tuberculosis is steadily advancing, and will at last overwhelm the reserve of suppression maintained by the pneumothorax, resulting in a hopeless terminal condition. In the majority the progress of the disease is but slow, it is biding the time when the pneumothorax is lost or discontinued, when it will burst forth again and still farther advanced than it was before the pneumothorax.

On every hand we read and hear the glib counsel to maintain pneumothorax indefinitely. Those who give this advice are first, the inexperienced and thoughtless; and second, those who are older and wiser in the work, and disillusioned. The first class have been but a few years in pneumothorax work, and usually in institutions or resorts. They have seen the first brilliant results, their patients leave for home to continue the treatment, and write occasionally for a year or two. But when the compression is lost, and the break comes, they do not return to the operator. The thoughtless ones are those who blame the patient, some complication or intercurrent illness, or some outside influence, for every pneumothorax which is not continued, and remember only the few cases that they have maintained for several years. The wise ones have learned that the duration of most pneumothoraces is limited, that often intercurrent illness, carelessness of the patient, or social necessity interrupts the treatment, that even if not interrupted, there is in many cases a slow extension of the disease; and that in nearly all, fluid or adhesions sooner or later bring about the termination of the treatment, to be followed by the reawakening of the disease. But they consider that the temporary restoration to a life which is tolerable is well worth the treatment, and they advise the patients to continue it for life, although they well know this will often be impossible.

It has been a most bitter disappointment to us that a treatment which promises so much, and which actually accomplishes temporary results which seem like miracles, should yet be productive of so few permanent cures. The fault lies at least in part in ourselves. We have failed to realize that the disease is suppressed, but is not quiescent in reality. We have unconsciously followed the indications of signs and symptoms which can no longer guide us. On account of the lack of signs and symptoms of socalled active tuberculosis after artificial pneumothorax, we have stopped giving treatment for tuberculosis, and have merely maintained the pneumothorax. Artificial pneumothorax creates conditions which are incomparably more favorable for the recovery from tuberculosis than those which existed before. Given proper treatment for the disease, it should be followed by a much greater number of recoveries. But it is not sufficient to entirely replace the treatment of the disease, and this is exactly what it is ordinarily expected to do. In the class of cases in which it is induced, the healing of the lesions under the most favorable circumstances would take at least two years. It is doubtful if pneumothorax can be maintained in the average case for a longer period. If we devote this period to a treatment of the disease instead of an effort to return the patient prematurely to full participation in active life, there is every likelihood that we can restore most of the patients to a condition far better than that which they now attain.

The special care which a patient should have during the reexpansion of the lung has been discussed in another article. It may not be out of place to briefly restate in this lecture that during the period that the lung is reexpanding, it is subjected to unusual stresses and strains, and that during this period the patient should be closely watched; at the slightest indication of toxemia, such as nervousness, irritable heart, loss of appetite, insomnia, and other symptoms the patient should be placed at rest. The ideal would be to carry out a series of more delicate tests during this period, such as functional heart tests, and others.

SUMMARY.

1. Artificial pneumothorax produces in suitable cases of tuberculosis the most brilliant improvement. Up to the present time this improvement has been but temporary in the vast majority of cases.

2. Artificial pneumothorax is not a treatment of tuberculosis, but is merely an adjunct to treatment.

3. After pneumothorax the clinical symptoms of tuberculosis are suppressed before there is any real progress toward cure, and consequently are not only worthless, but actually misleading as guides to treatment.

4. The physical signs of socalled activity are suppressed both on the compressed side and in the compensating lung, and may not reappear until the disease has made more progress than would be required to cause marked signs in an ordinary patient.

5. The physician should constantly keep in mind the principles of immunology upon which these suppressions depend, and should remember that the usual guides to treatment, based on clinical symptoms and physical signs, fail entirely in cases of pneumothorax.

6. Any patient who has been given artificial pneumothorax should continue to receive a treatment for tuberculosis which would be adequate for the pathological condition which is present, and which would undoubtedly be given if the physical signs and clinical symptoms were not masked by the pneumothorax.

NOTE.

During the past three years the principles outlined have been more or less thoroughly applied to certain of the patients treated by artificial pneumothorax at New Haven. The time has been too short, and the cases too few, for the submission of either case reports or statistical data. But a comparison of the results of such treatment with those attained in patients who, after their clinical symptoms had become slight or none, followed a régime suited to their clinical symptoms rather than to their pathological conditions, indicates strongly that these principles will, if carried out, result in a greatly increased proportion of permanent benefit from artificial pneumothorax.

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Reflections Upon Nine and One-Half Years' Experience With Artificial Pneumothorax*

By PAUL H. RINGER, M.D.,
Asheville, N. C.

In 1917, my partner, Dr. Charles L. Minor (1), read a paper before this section on four and one half years' experience with artificial pneumothorax. In it he reported upon a hundred cases in which an attempt had been made to compress the lung. It is my purpose today to glance back over our pneumothorax work done during the past nine and a half years and to see what impressions and conclusions can be reached as a result of constantly growing experience with the procedure.

It is no longer necessary to dwell in detail upon the indications for artificial pneumothorax. We find, however, that we are likely to try pneumothorax in milder cases than formerly, in those cases where the patient is stagnating instead of going definitely down hill, or in those cases where a relatively small area of disease shows signs of increased activity or of spread. The following recent case is a good illustration of rapid increase in activity in a patient with slight physical findings and symptoms.

Case.—Miss K., under treatment eight months and doing well, on January 22, 1922, began to have slightly streaked sputum and finally had small hemoptyses. Physical signs increased, cough and expectoration as well, x ray showed corresponding changes and she began to have a febrile temperature. On February 22 pneumothorax was started. Excellent collapse was obtained with disappearance of all symptoms of cough, sputum and temperature (Fig. 1). Now her condition is excellent. We are also more likely to try pneumothorax as a purely palliative measure in the hope of giving the patient comfort and relief.

Cases with apical involvement offer a better outlook for satisfactory compression than do cases with basal disease because partial collapse, so often beneficial as will be pointed out later, is far more apt to be possible when the main seat of trouble is at the apex.

Cases of profuse hemorrhage give us some of our most brilliant results in artificial pneumothorax, as in this form of treatment we possess the only direct means of arresting hemoptysis.

The technic has become more simple, and the process of giving injections less formidable than of yore. We find the preliminary injection of morphia almost never necessary. Occasionally a dose of aromatic spirits of ammonia or of codeine has to be given after the injection.

Atmospheric air has been used exclusively. It works just as well as the nitrogen we so conscientiously used for years. We have not seen any benefits from using the warmed air recommended by some authors.

One point in the technic of injection has proven of value in my hands. It not infrequently happens at a first injection, that the proximal arm of the manometer will show a marked negative reading without fluctuations, when one feels almost certain that the point of the needle has penetrated the parietal pleura. If the needle is gradually withdrawn it is felt to slip out of the pleural cavity and the manometer falls to zero. I believe that this high negative, nonfluctuating reading denotes that the point of the needle is resting against the visceral pleura. When such condition presents itself, if a minute amount of air (as much as can flow through the needle when the air cock is opened for between a tenth and a fifth of a second) is allowed to flow, the visceral layer of pleura is pushed away from the point of the needle, and the characteristic free negative manometric fluctuations at once set in. I have noted this so many times that it cannot be merely a coincidence. The procedure is not dangerous in any way, and is of value in creating a pleural space.

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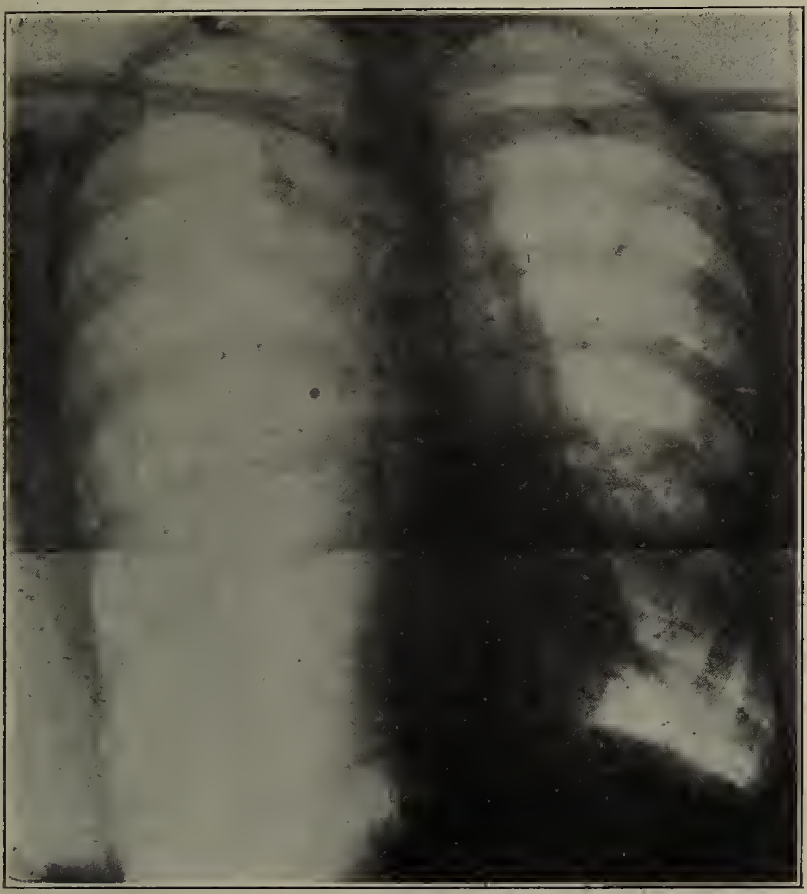

FIG. 1.—Patient after compression, left side.

Refills are more frequent and less massive than they used to be several years ago. The more I see of pneumothorax the more satisfied I am of the advisability of this principle, based on the comfort and safety of the patient. Riviere (2) says: "It is not wise to let refills run above seven hundred or eight hundred c. c. and in most cases five hundred c. c. or less is a preferable amount." I find myself absolutely in accord with him. By allowing too long an interval between refills not only is excessive mediastinal shifting brought about, but the formation of adhesions in the costophrenic sinus is favored, which may easily become the starting point for obliteration of the pleural cavity. In the past three years I have had but two cases under my care that were allowed to go more than twenty-one days between refills.

In hemorrhage cases alone do we find justifications for the use of massive injections. I have given one thousand to fourteen hundred c. c. at the first injection. Here, where we wish to squeeze down the lung sufficiently to occlude the bleeding point, small doses are useless, and may even prove harmful in a manner analogous to the tourniquet that is placed about a bleeding limb sufficiently tight to impede the venous return but not to cut off the arterial influx.

PRESSURE.

As a rule the final air pressure as recorded by the water manometer need not be over plus four cm. Occasionally, as when a cavity remains persistently open, and it is believed upon fluoroscopic and radiographic examination that the adhesions can be stretched, higher pressures, up to eight or ten cm. of water are permissible. In one case, not long ago, I erred in not pushing the pressure up. The patient passed out of my hands, and a colleague, profiting by my mistake in judgment, greatly increased the pressure and finally succeeded in compressing an apical cavity and in obtaining a total collapse.

I cannot protest too strongly against the practice of using high pressures with the object of tearing adhesions. This is most risky, as it is not known whether blood vessels are in the adhesions, and Jacobaeus (3) reports his only alarming experience as resulting from profuse hemorrhage occurring in the course of the cauterization of an adhesion. Furthermore, it cannot be foretold at which end the adhesion will tear if it does give way. The visceral extremity may tear, and in so doing lacerate the lung causing severe hemorrhage with a resulting hemopneumothorax. It is safe to stretch adhesions gently, but not to submit them to excessive tension.

The accidents incident to artificial pneumothorax seem to be becoming fewer and fewer. A search of the literature reveals but one or two reports of untoward occurrences. Those bugbears, pleural shock and air embolism are becoming curiosities rather than dangers. Since the spring of 1919, I cannot remember a single alarming symptom appearing during or immediately after an injection. My experience, I am sure, will be duplicated by practically every worker in this field.

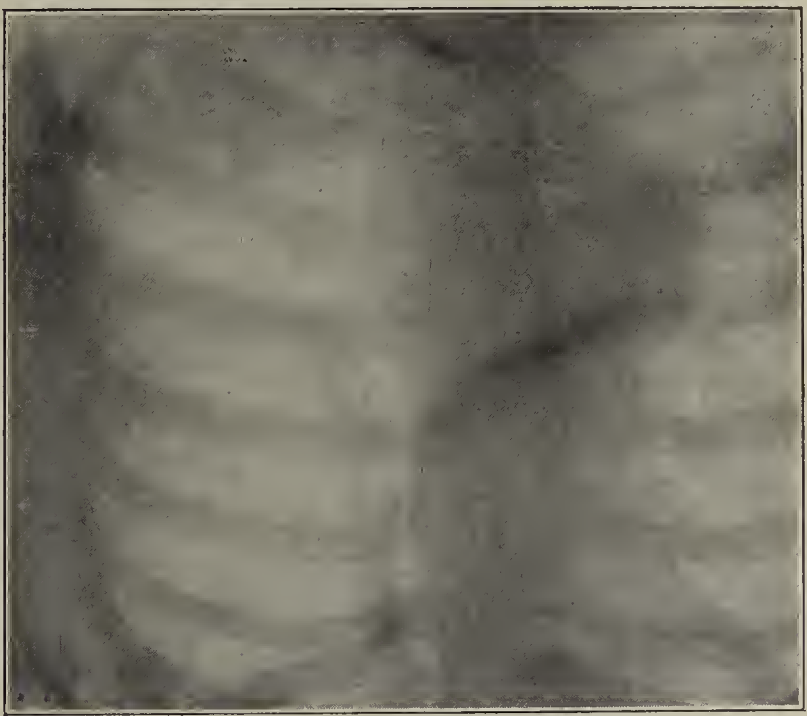

FIG. 2.—Attempted pneumothorax, left side. Absolute failure.

I believe the reasons for this satisfactory condition of things are twofold:

1. Better anesthetization of the field of injection

especially of the pleural membrane itself. This I feel is important. If patients are not hurt they will not exhibit many of the purely nervous reflexes that formerly were attributed to the mechanical injury sustained at the moment of injection. It is asserted moreover that the reflexes causing pleural shock arise from the visceral pleura where there is luxuriant arborization of filaments from the pneumogastric nerve. If this theory be true the necessity of careful pleural anesthesia becomes all the more apparent, as at any first injection the visceral pleura is almost certain to be touched.

2. Better manometric interpretation. Unless the point of the needle penetrates the wall of a cavity and in so doing lays open the lumen of a vessel into which air from the lung can be aspirated with each respiratory excursion, prior to any air having been allowed to flow from the pneumothorax apparatus, there is no excuse for air embolism if the manometric readings are strictly observed and their simple meaning correctly interpreted.

CHANGES OF SUCCESS AND FAILURE IN ANY GIVEN CASE.

There is nothing in which I have less faith than in my ability to foretell whether I will be successful in establishing an air space at the initial injection. When all is said and done, when stereograms have been taken and studied, when the respiratory motion of the pulmonary bases has been estimated and observed by percussion and under the fluoroscope, when the patient had been carefully auscultated and the presence or absence of pleural frictions determined, chances of success are very uncertain. I am glad to see my opinion thus corroborated by Boas (4): "Physical signs and fluoroscopy will not always give assurance whether or not collapse of the lung is possible. In many cases all efforts to enter the pleural cavity are unavailing although no difficulty is expected." The three accompanying figures illustrate this point well.

TOTAL AND PARTIAL COLLAPSE.

Were benefits derivable from artificial pneumothorax to depend upon total collapse, the method would have been loooked upon as so rarely of service as to hardly warrant its general use. Fortunately partial collapse is productive of great good. Some of the cases showing most striking results have done so as a result of partial collapse only.

No better illustration of this fact could be given than the following case of Mrs. C., who had bilateral involvement, by far most marked on the right, with temperature to 102°, a really terrible cough, much sputum, emaciation, night sweats, all the classical symptoms of advanced progressive tuberculosis. As a last resort artificial pneumothorax was tried. The result was miraculous. The temperature dropped, cough was greatly lessened as was sputum, appetite returned, and in every way marked improvement ensued. Now, one year after collapse, while not well, she is perfectly comfortable, goes about the house, can take motor rides, and is able to enjoy life.

To be sure, partial compression will not bring about such total disappearance of symptoms as will complete collapse, but partial compression will very frequently do away with the symptoms of toxemia such as fever, night sweats, anorexia, and other symptoms. The reason for this appears to me to be that often the site of greatest toxin absorption is not from the walls of a cavity but from the pericavernous lung tissue. This tissue will frequently be well compressed while dense adhesions prevent the cavity from closing. Partial collapse proves of more service when the adhesions limiting it are apical rather than mesial or basal. The method of Jacobaeus of cauterizing adhesions and thus converting partial into total collapse holds promise.

Bilateral compression has from time to time been mentioned in the literature. It has been mentioned as being done simultaneously, and also as being done successively first on one side and then on the other at an interval of a few weeks or months. I have never been able to convince myself of the justifiability of this procedure and have never seen a case in which I was even tempted to try it. It has always struck me as riding a good horse to death, and as coming under the head of meddlesome interference.

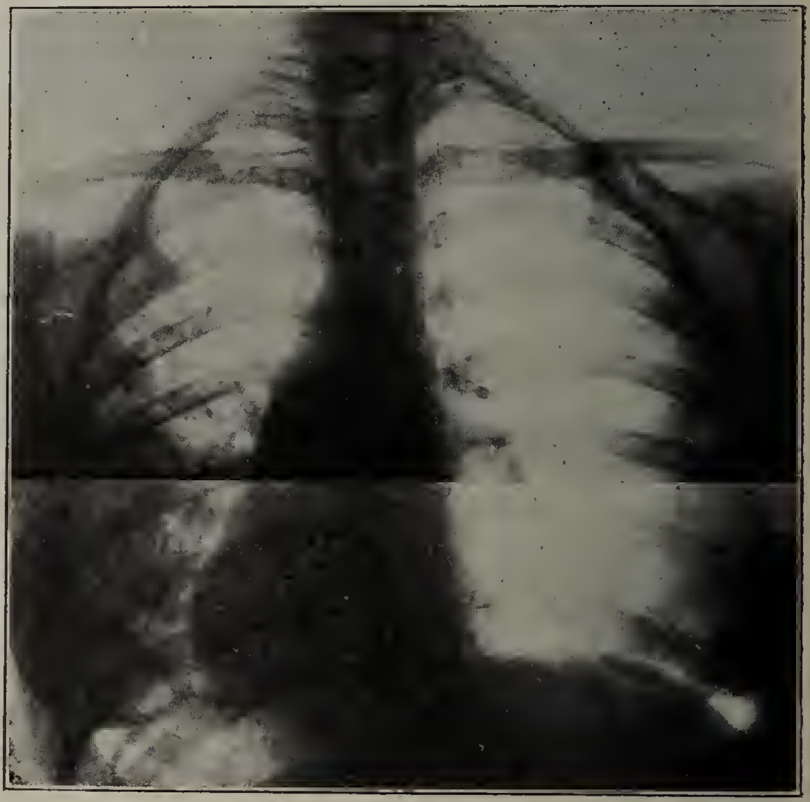

Fig. 3.—Attempted pneumothorax, left side, no difficulty in securing compression. Picture before compression was attempted.

COMPLICATIONS.

The most frequent complication met with and the one that at present is offering the greatest subject for discussion and controversy is fluid.

Our views with regard to the appearance of fluid in the course of an artificial pneumothorax have undergone great modifications in the past few years. Its presence used to be looked upon as a beneficial occurrence, helping to preserve the collapse, lessening the frequency of refills, and, save when becoming infected, productive of no harm. But with added experience, many cases are constantly seen that, where fluid developed, henceforth do not get along as well. The great harm that fluid does is to favor the gradual obliteration of the pleural cavity from below upward, and to draw the mediastinum over toward the treated side. In an excellent paper read before this section last year, Stivelman and Rosenblatt (5) laid down the principle that in many cases the expectant form of treatment of fluid is not justifiable. In our work I have not encountered fluid as frequently as have many other observers. The common consensus of opinion is that it occurs in about fifty per cent. of the cases. I regret that my records are incomplete on this score, but I am certain that I have not encountered fluid in over twenty-five per cent. of the cases, unless one counts the ounce or two that often accumulates in the costophrenic sinus, that shows no tendency to increase, and that can be discovered only by the x ray. In my experience these minute quantities of fluid do no harm. As I wrote in 1917 (6), I have for several years made it a practice to always aspirate any fluid reaching the fourth rib, and to substitute air. I have done this even in the absence of signs of retraction of the pleural cavity or of mediastinal shifting toward the treated side, which is the indication given by Stivelman and Rosenblatt. I do not differ with their indication in any way. The reason I have not followed it is that my work not being under one roof, the bringing of patients to the office every time for röntgenological examination often proved too fatiguing for them.

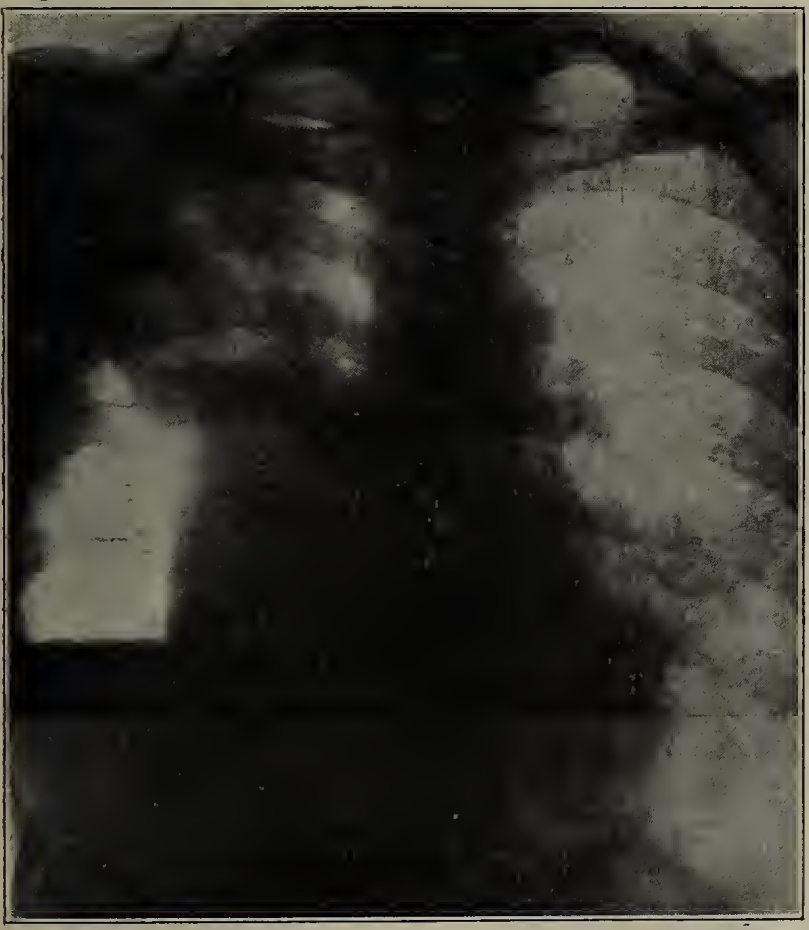

FIG. 4.—Partial compression with remarkable clinical result.

As a corollary to this method of dealing with fluid, may be noted the marked tendency at present to substitute air for fluid after thoracentesis in cases of pleurisy with effusion.

APPEARANCE OF OR INCREASE IN ACTIVITY IN UNCOLLAPSED LUNG.

This unfortunate complication is met with not infrequently by all doing much artificial pneumothorax work. The more careful one is in the selection of cases the rarer will be its occurrence. I am, however, of the opinion that in those cases in which artificial pneumothorax can be considered, and in which, unless collapse is obtainable, the outlook is absolutely bad, the risk should be run and the patient given the chance, for occasionally surprisingly good results will be obtained in cases showing both radiologically and on physical examination evidences of considerable activity in the relatively good side. These patients can often be helped and their remaining days made more comfortable.

DURATION OF COLLAPSE.

This important question is a difficult one to decide. In too many cases complications will decide it for us by forcing the discontinuance of injections. If no complications occur, the cases fall into three groups: 1, Cases with total collapse; 2, cases with partial collapse, and 3, cases collapsed for hemorrhage.

CASES WITH TOTAL COLLAPSE.

In my opinion collapse should be maintained for at least two years and even longer. We have no way of telling when healing is complete, and a perfect collapse is too valuable an asset to be lightly dispensed with. Postmortem findings in such cases are too infrequent to permit of the formation of conclusions as to the time element necessary for permanent healing. Refills can now be so universally obtained that the question of the patient having to stay in one place does not enter into the matter. After two years or so it seems reasonably safe to allow reexpansion.

CASES WITH PARTIAL COLLAPSE.

These patients should be refilled indefinitely. The compression is not such as to bring about complete healing and the benefit derived from compression is to be obtained only as long as it is maintained. If it is released, evidences of activity will almost invariably set in.

CASES COLLAPSED FOR HEMORRHAGE.

This class of cases can further be subdivided into two: a. Cases in which the opposite lung is free from disease; b, cases in which the opposite lung is more or less involved.

We not infrequently see patients exhibiting profuse hemoptysis in whom we had not considered artificial pneumothorax prior to the advent of bleeding despite the fact that the process was wholly or mainly unilateral. If forced to collapse the lung to control hemorrhage, the collapse should be continued as though it had been begun in the absence of any emergency, as thus both subsequent bleedings will be avoided and new areas of involvement as a result of the hemorrhage will be nipped in the bud. In cases in which the opposite lung is more or less involved collapse should be maintained only until such a time as we feel reasonably certain that the bleeding point is firmly plugged. I know of no guiding rule. I have, however, found, purely by experience, that from three to four weeks is a sufficient length of time to maintain the collapse which should be kept under rather higher pressure than when done in the absence of hemoptysis. Needless to say, as this class of cases is unsuited for pneumothorax and the procedure is an emergency measure, the sooner the added strain upon the uncollapsed lung can be removed, the better.

ARTIFICIAL PNEUMOTHORAX IN ABSCESS OF THE LUNG.

My experience in this class of cases is small but at the same time most unsatisfactory. The one brilliant result that we obtained was, I think, back in 1912 in one of the first cases Dr. Minor and myself ever did. A dying man was converted in a few weeks into a healthy vigorous individual who resumed his work and was eventually lost sight of. Other cases stand out in my memory in a very different light. In one a lung abscess that was being compressed burst into the pleural cavity with resulting death of the patient. In another practically the same thing occurred. In still another compression did no good and the patient eventually recovered, after having reached the brink of the grave and refusing surgical intervention, by the providential spontaneous rupture of the abscess into a bronchus. All in all I am not in favor of attempting to squeeze out an abscess of the lung by artificial pneumothorax. It is too much of a hit or miss method. Surgery is much better. Cases of lung abscess seen really in their incipiency offer a much better chance of cure by compression than do those seen when fully established. I have not had the opportunity to try compression upon any early cases.

Brilliant though immediate results frequently are in cases treated with artificial pneumothorax, the cold light of statistics shows that the percentage of permanent complete recoveries obtained is disappointingly small. Boas, from an experience of six years at the Montefiore Home, confesses frankly that "positive cure is too rarely accomplished. Generally marked improvement sets in for a time, and then some complication supervenes which causes the disease to resume its course. The patient often gets a reprieve of a year or two, and this means a good deal."

I would not be thought, as a result of almost a decade of experience, to consider artificial pneumothorax as of little avail. In some cases it will actually drag a patient out of the grave and restore him to permanent and complete health. In many cases it will help—will inhibit the advances of disease and will prolong life—but a glance at the tabulation of any fairly large number of cases covering a few years will show that by far the greater number are either dead or wholly incapacitated. Nevertheless, artificial pneumothorax succeeds in a sufficiently large percentage of cases to warrant its continued use, together with constant searching for better technic and improved methods to make the procedure more complete.

In his paper in 1917, Dr. Minor reported on one hundred cases of attempted artificial pneumothorax. Of his hundred cases, in eleven no entry was possible, and forty-four were classified as failures mainly because of the presence of adhesions. I wish to report on 101 cases occurring in our practice in which at least partial collapse was obtainable, thus eliminating the failures in the sense of no pneumothorax being obtainable.

I have divided these 101 cases into five classes: Dead, dying, living, well, and unknown.

By living I mean still in fair condition, but pursuing their cure and incapacitated from work. By well I denote those that have achieved a symptomatic and economic recovery.

TOTAL CASES—101

Dead	*Dying*	*Living*	*Well*	*Unknown*
41	5	25	14	16

Eliminating the unknown class, there are left eighty-five cases upon which to base our results.

Dead	*Dying*	*Living*	*Well*
41 or 48.2%	5 or 5.8%	25 or 29.4%	14 or 16.4%

The five cases in the dying class if added to the dead class make a total of fifty-four per cent. as practically dead.

Among the fourteen classified as well, three deserve special mention. Two patients recovered not because of, but despite their pneumothorax. In one not the slightest effect was produced, and another was a case of lung abscess which finally ruptured spontaneously after artificial pneumothorax had been abandoned and surgery refused. The third patient, still under treatment, is a most remarkable one of spontaneous pneumothorax in an individual never having shown any symptoms of tuberculosis. The lung has expanded twice, only to have the pneumothorax recur. It is now being held down in the hope that the opening will permanently heal. Thus, subtracting the three cases just mentioned, there are but eleven, or 12.9 per cent. of the eighty-five cases, that owe their recovery to artificial pneumothorax, not a large percentage when we consider that these 101 cases were all individuals in whom at least a workable collapse was obtained. Twenty-five others, however, are still living, and of these twenty-five, sixteen, while incapacitated from work, are enjoying fair health and are not bedridden invalids. This brightens the picture. Thus out of the 101 cases fourteen are well and sixteen able to lead a life limited, it is true, but still not that of one hundred per cent. invalidism. This gives an aggregate of practically thirty per cent. showing marked improvement and freedom from absolute invalidism, surely a number amply justifying the use of artificial pneumothorax.

To epitomize briefly conclusions reached as a result of nine and one half years' experience with artificial pneumothorax, it can be said that the method is distinctly valuable, and one which no man devoting himself largely to pulmonary tuberculosis can afford to neglect. Its applicability will of course vary with the personal opinion of each one that uses it. To some the field will widen, to others it will contract. Immediate results are often surprisingly brilliant; the percentage of really permanent arrests disappointingly small. Its use in hemorrhage is of the greatest value. It is often an immediate life saver, frequently a life prolonger, not seldom a bringer of comfort and relative relief from distressing symptoms. Finally it is the one method at our command that offers to the far advanced unilateral or relatively unilateral case a good chance of further longevity, and a reasonable chance of economic recovery.

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The Value of the Röntgenogram in the Diagnosis and Prognosis of Pulmonary Tuberculosis*

By GEORGE G. ORNSTEIN, M.D.,
New York.

The use of x rays in the diagnosis of diseases of the lungs has placed in our hands a valuable aid to the early diagnosis of pulmonary tuberculosis. In the last few years with an improvement in technic and better interpretation of shadows, question as to the value of röntgenograms in disease of the thorax has ceased. The more uniform technic and comparison of x ray shadows with autopsy findings have helped to clear up many of the differences in opinion in interpretation that previously existed.

Before discussing x rays in pulmonary tuberculosis, perhaps it be best to go through a few of the simple rules of physics which may help us in understanding the seemingly difficult problems which frequently occur in the interpretation of röntgenograms of the lung.

PHYSICS.

The shadows appearing on the x ray plate are dependent upon the ability of substances to absorb the rays from the target of the tube. The rays, going through a substance of uniform density, will throw a homogeneous shadow, varying only in that the area over which the tube is centered is more distinct than that of the periphery. If, however, in this very substance, there are areas of greater density, the shadows thrown by these areas will be more intense than those of the substance itself. On the other hand, if there be areas of lesser density, it naturally follows that the shadows thrown by these areas will be less intense. This principle also holds true in röntgenograms of tissues. If, in normal areas, pathological changes occur, more or less intense shadows will be cast, depending upon whether the density of these pathological areas is greater or less than the density of the surrounding normal tissue. We can therefore see that pictures of normal areas have definite standards, and if changes occur which either increase or decrease the densities of these areas to an appreciable degree, they will be noted in the röntgenogram. It is particularly fortunate that in radiography of the pulmonic area the structure of the lung is of such nature that very slight changes in density can be recognized by their contrast with the air containing lung tissue.

TECHNIC.

In the technic of taking the plates lies the cause of most of the differences of opinion as to the value of the röntgenogram. Faulty technic invariably leads to incorrect interpretation.

Depending upon the thickness and density of the part to be x rayed, either a soft or hard tube is used; the harder the tube the greater its penetration. For example: if tissues or small bones are to be rayed, a soft tube should be used; for areas of greater density a hard tube is the choice. The important thing is to have a tube that has penetration enough to go through the depth of the part to be x rayed. If the penetrating power is too little, cloudy and exaggerated shadows are shown. If the penetrating power is too great, a diminished shadow is shown and the fine detail that is necessary for a good reading is lacking. We can readily see how much depends upon correct technic for proper interpretation.

NORMAL APPEARANCE OF THE LUNG.

It is of the greatest importance that the x ray be used with a clear appreciation of what are the normal appearances of the lung. Röntgenographically, the lung may be divided into hilus, bronchial tract and parenchyma. A clear perception of the appearances of these divisions is absolutely essential before pathological changes can be recognized. The normal shadows of the hilus of the lung have brought forth much discussion. At first these shadows were accredited to early tuberculosis. This view was quickly discarded. Investigators were divided in their beliefs that the shadows are due to bloodvessels and lymphatics or bronchi. The accepted view is that they are due to both the vessels and bronchi. The shadows are accentuated where a vessel or bronchus crosses a rib or where vessels or bronchi cross each other. Normal glands are not visible in this area. Healed tuberculous glands are common and fibrosed and calcified glands are often seen. The hilus shadow is well marked on the right side, but hidden on the left by the shadow of the heart. Radiating out from this root region, in fanshaped fashion, are the divisions of the bronchi and the vessels. Attention is brought to the bronchial trunks going to the upper third of the lung. In the upper third of the lung the vertebral branch and the branches to the first and second interspaces can be followed until near the periphery of the lung, where they appear as fine lines and are lost in the parenchyma. The bronchial shadows are continuous and here and there exaggerated by intersection. The parenchyma of the lung does not cast shadows.

PULMONARY TUBERCULOSIS.

Cole (1), in 1908, was the first in this country to insist that an early tuberculous lesion of the lung could be diagnosed by röntgenography. He ably set up standards for the shadows of the socalled tubercle, not the pathological tubercle that is microscopic, but a definite amount of tuberculous deposit of sufficient size to be noted at the autopsy table. This shadow Cole named tubercle and larger shadow conglomerate tubercles. He further stated that these tubercles, if seen along the course of the bronchi or in the parenchyma, could safely be called tuberculous. His work has stood through these years. The tubercle shadows are difficult to describe. They are more easily demonstrated on the plate. They have been given many descriptions. A few of the popular ones are cloudy, tobacco smoke, cotton ball, and mottling. The last two are perhaps the better terms. The intensity of the shadows is absolutely dependent upon the density of the tubercle and varies from the recently formed tubercle, which has a soft cottony appearance with its margins merging into the adjoining parenchyma, to the calcified and fibrous tubercles which cast intense shadows and have well defined margins. Caseation, consolidation and cavity formation will vary the picture, the first two throwing intense shadows while the last mentioned shows the rarefaction that is so characteristic of cavity formation.

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*From the Department of Tuberculosis, Vanderbilt Clinic; Medical Department, Columbia University. Read before the Association of Tuberculosis Clinics, Academy of Medicine, New York, November, 1921.

CLASSIFICATION.

Tuberculosis of the lung from a röntgen point of view may be divided into groups dependent upon anatomical position; that is, whether it involves the hilus, the bronchial trunks, the parenchyma or a combination of any of these. It may be again divided into minimal, moderately advanced or far advanced, depending upon the extent of the lesion. The character of the lesion may also give one an idea as to whether or not an active or inactive condition exists.

HILUS TUBERCULOSIS.

In hilus tuberculosis we see something more extensive than in the normal picture, in which we see shadows more or less diffuse with a few calcified or fibrous tubercles. The hilus shadows now extend out more. Tubercles are more numerous and may extend out from the root into the parenchyma. We must not overlook the fact that other conditions may cause shadows in this area, particularly pneumonoconiosis, such as anthracosis from coal dust, chalicosis from stone and siderosis from iron. The fuzzy outline of the tuberculous shadows help considerably in the differentiation.

PERIBRONCHIAL TUBERCULOSIS.

Peribronchial tuberculosis shows a thickening of the bronchial trunk with tubercles to be seen here and there along its course. In places the tubercles may extend out into the parenchyma. The vertebral trunk and those of the first and second interspaces are the ones for which tuberculosis has a predeliction. The process as a rule can be traced up from the hilus. I may state that this type of tuberculosis is confined chiefly to the upper half of the lung.

PARENCHYMATOUS TUBERCULOSIS.

The parenchymatous type requires little description. If present, one has little difficulty in seeing it. Invariably a parenchymatous lesion is confined to the upper half of the lung. Tuberculosis of the base is seen only occasionally. When tubercles can be demonstrated in the parenchyma of the lung and are situated in the upper half of the lung, do not hesitate in making a diagnosis of tuberculosis.

EXTENT OF LESION.

The extent of the lesion may be best classified in the manner put forth by Brown, Heise, and Sampson (3). Their classification is as follows:

1. Incipient or minimal tuberculosis in which x ray findings to show a total area involved not greater than the area to the upper level of the second chondrosternal junction on one side in the form of scattered mottling, or an intense shadow interpreted as pleuritic.

2. Moderately advanced where x ray findings show an intense shadow, not interpreted as pleuritic, of no greater extent than the area above the upper level of the fourth chondrosternal junction on one side; or area of rarefaction interpreted as cavities limited to one interspace; or scattered mottling over a greater area than under minimal, but not greater than the area of one entire lung and to the level of the second chondrosternal junction on the opposite side.

3. Far advanced: The x ray to show an intense shadow, not interpreted as pleuritic, of greater extent than the area to the level of the fourth chondrosternal junction, or areas interpreted as cavities, greater than one interspace, or scattered mottling greater in extent than under moderately advanced.

DIFFERENTIATION.

That röntgenograms of the lungs showing tuberculous involvement may be very easily confused with other pathological conditions of the lungs has been unnecessarily exaggerated. The pathological conditions from which a differentiation may have to be made are pneumonoconiosis, syphilis, pulmonary abscess and various tumors of the lung. Before differentiating them we must remember that, although we are dealing with shadows, these shadows are thrown by pathological areas that have certain characteristics either in structure or location.

DIFFERENTIAL DIAGNOSIS.

Pulmonary tuberculosis may be confused with pneumoconiosis. The points of difference are that tuberculous infections occupy the apical regions while in pneumoconiosis the subapical regions are involved. Tuberculosis is not evenly distributed throughout both lungs but is apt to involve one lung more than the other. The shadows in pneumonoconiosis are more uniform in intensity, have sharper margins, are larger in size and are more evenly distributed, extending out from the roots almost equally from both sides. The two conditions are often found together.

Recently a considerable number of men have asserted that syphilis of the respiratory tract exists more frequently than the facts show. Before trying to make a differentiation I wish to quote the following postmortems (4): At Johns Hopkins Hospital, out of 2,800 postmortems, twelve cases with syphilitic disease in the lungs were found, of which eight were congenital and four acquired; Lord (5) reports that out of 3,000 autopsies at the Massachusetts General Hospital only one case of acquired syphilis was found; at Bellevue, Symmers (6) reported 4,880 autopsies of which there were twelve cases of syphilis of the lung.

Syphilis of the respiratory system attacks the trachea bronchi, hilus and base of the lung. We will not consider the congenital form. In the acquired, two varieties are found, the gummatous and interstitial. The gummata may vary in size from a hazel nut to a small sized orange. Gummata have a definite shape and are invested with dense fibrous capsule. They are found chiefly in the interstitial tissue. They rarely break down into cavity formation, but form a dry cheesy mass which finally becomes converted into fibrous tissue. The more common form is the interstitial form. It attacks the hilus and descending bronchial trunks to the base of the lung. The type of lesion is an intense fibrotic infiltration. Another type of the interstitial form is an infiltration of all the bronchial trunks throughout the lung.

Recently I have been impressed with a number of cases referred to the Vanderbilt Clinic as probable pulmonary tuberculosis. Clinically they have all the earmarks of an incipient tuberculosis. The largest number give a history of recent hemoptysis. A severe dry cough but often a cough with expectoration, accompanied with a slight rise in temperature, general feeling of malaise and loss of weight are the symptoms of the remaining number. Both groups have very scanty physical findings. Repeated sputum examinations are negative. Though the x ray films absolutely rule out pulmonary tuberculosis the similarity of the films in this group of cases is striking, in that there is some enlargement of the transverse arch of the aorta and that the bronchial trunks to the base of the lungs are markedly exaggerated due to a fibrotic infiltration. In the majority of the cases there is some history of luetic infection and some had a positive Wassermann reaction. Under specific treatment most symptoms clear up and the general condition of the patient improves. This group of cases may be regarded as probable syphilis of the lung. If this group could be definitely proved to be specific in origin perhaps the diagnosis of many cases of peribronchial tuberculosis will have to be changed.

Tuberculosis involving the parenchyma of the lung is not to be confused easily with syphilis of the lung, not only on account of its location but also due to the character of the lesions which are different in type. A positive Wassermann reaction along with a röntgenogram showing a lesion in the lung does not mean syphilis of the lung. And it is also to be remembered that tuberculosis is often found in syphilitic patients.

Pulmonary abscess, whether multiple or single, cast shadows atypical of those cast by the pathological areas in tuberculous infections. The shadow is more or less homogeneous with a bit of rarefaction in the centre. If it opens into a bronchus part of the contents of the abscess may be expectorated, and air then comes into the cavity. The abscess may now show a definite fluid line. Though an abscess may occur in any part of the lung, they are found chiefly at the base or centre. A careful history laying stress upon whether the condition followed a tonsilectomy insufflation of any foreign body, unresolved pneumonia, or other condition, will help considerably.

Tumor shadows are so different from the shadows cast by tuberculous areas that a differentiation is not necessary. The history and clinical findings will help considerably in the differentiation in all the above conditions.

DETERMINATION OF CLINICAL ACTIVITY.

In a preliminary study Sampson and I (6) attempted to determine clinical activity from röntgenograms. The work was based on the relationship of circulation to the tubercle. When the tubercle was healed or walled off by either calcification or fibrous infiltration it was cut off from the circulation. No absorption of toxic substance was possible and therefore no constitutional symptoms forthcoming. From the röntgenogram it is possible to determine whether a tubercle is walled off or not. The intensity of a shadow is directly proportionate to the density of the tissue x rayed. Therefore, tubercles cast various shadows from the new formation of tubercles which appear soft and cottonlike, with margins that merge into the parenchyma of the lung to the healed tubercle that appears intense, with sharp definite margins. When the former picture (new tubercle formation) can be demonstrated in the röntgenogram we can be reasonably certain that both pathological and clinical activity are occurring. Assuming that this soft cottonlike appearance with illdefined margins merging into the parenchyma of the lung indicates activity, as the disease retrogresses, the lung tissue surrounding this area appears to become better aerated and at the same time we realize that the original shadow is smaller or more compact. As time goes on and the patient is doing well, the mottling loses more of its collateral haziness, the cottonlike shadows become more compact and their appearance more discreet, the ray filtering through areas that were previously hazy and the picture is that of a better aerated lung.

As a rule further retrogressive changes occur in this group. This group is clinically inactive. Sampson and I, basing our interpretation of clinical activity on the appearance of new tubercle formation, compared the x ray diagnosis with the clinician's diagnosis of clinical activity and inactivity. The results were as follows: Out of one hundred cases, eighty-seven agreed with the findings of the clinician. Out of twenty-six cases diagnosed active by the clinician, the x ray called twenty-one cases active and five cases inactive. The course of the five cases were inactive. Out of seventy-four cases called inactive by the clinician, sixty-six cases were diagnosed inactive by the x ray and eight active. Out of the eight cases the course of six were inactive and two active. The course of the disease was as a rule the same as that of the x ray interpretation of activity or inactivity. These two columns agreed in ninety-one per cent of the cases.

PROGNOSIS.

From the above it can easily be seen how the x ray may be used in the prognosis of the disease. Particularly in the cases where it is not possible to procure accurate clinical data so necessary for the making of a diagnosis of activity or inactivity of a case. It has also been shown that the course of the disease is usually that of the x ray interpretation, of activity or inactivity. And on this determination, especially when backed by a clinical interpretation the outline of treatment may be based. As for example—in the clinical active—the complete rest cure, whereas in the inactive, the allowing of certain liberties. The value of the röntgenogram is also of great service in comparing films of the past with those of the present in determining whether a lesion is progressing or retrogressing.

CONCLUSION.

In concluding I wish to state that the x ray examination is perhaps unnecessary as a means of diagnosis in the frank case of pulmonary tuberculosis which not only presents the history so characteristic of the disease (hemoptysis and wet pleurisy) but also the symptomatology and the physical findings. The value of the röntgenogram in such a case will be for the extent and character of the lesion. It is also of value as a record when in the future a plate is again taken to determine whether the lesion is progressing or retrogressing. In cases in which the history is obscure and the physical findings scanty and indefinite, a röntgenogram is absolutely indispensable. What the plate shows in a case of this sort is invaluable. And inasmuch as this is the type of case in which we hesitate to make a positive or a negative diagnosis we can readily see how great an aid the röntgenogram is in helping us make the diagnosis.

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Further Studies in the Value of the Complement Fixation Test in Tuberculosis*

With observations, using the Hecht-Weinberg modification

Second Paper

By ROY UPHAM, M.D., F.A.C.S.,
Brooklyn,
Gastrcenterologist, Prospect Heights Hospital and Carson C. Peck Memorial Hospital, Brooklyn, N. Y.
and A. J. BLAIVAS, M.D.,
Brooklyn,
Pathologist, Prospect Heights Hospital and Williamsburgh Hospital. Serologist, Swedish Hospital, Brooklyn, N. Y.

Some time ago it occurred to the writers (1) to apply the modification of Hecht and Weinberg in the complement fixation test for tuberculosis. At that time we reported sixty cases, and found that the modification gave a greater percentage of positive reactions than the original technic.

It is a well known fact that the antigen is the most important factor in complement fixation work. The antigen of choice is the one that fixes complement most often in a given disease. It is the object of the writers to determine first, which is the most delicate antigen, and second, to interpret the laboratory findings.

All cases here reported were patients that consulted one of us (Upham) for gastrointestinal disturbances and tuberculosis was not suspected. Inasmuch as a Wassermann test was made on each patient as a routine, it was thought advisable to include the complement fixation test for tuberculosis, using the antigens of Petroff, Miller and Fleisher-Ives. This will, of course, account for the large percentage of negatives.

We began using this modification in conjunction with the original technic with the object of perfecting the complement fixation test for tuberculosis with the expectation that it may give as valuable and consistent information in tuberculosis as does the Wassermann test in syphilis.

The Wassermann reaction was made on each patient using both the cholesterin and ether soluble, acetone insoluble antigens. As stated above, in the complement fixation test for tuberculosis, the antigens of Petroff, Miller and Fleisher-Ives were used, and the results were estimated in terms of +, ++, +++, and ++++, but any result below +++ was considered negative. In the Hecht-Weinberg modification, any result below ++++ was considered negative.

The work was done separately, charted, and the laboratory had no information whatsoever regarding the patient. The temperature, weight, physical findings and x ray examinations were made on each patient. Each patient also received from 0.5 to 2.5 milligrams of old tuberculin and the von Pirquet test.

The table[1] shows that we have classified our cases as follows: 1. As they presented themselves. 2. Clinical tuberculosis. 3. Tuberculosis suspects. 4. Nontuberculosis. 5. Other diagnoses.

Ives and Singer (2) state that the complement fixation test recognizes only active tuberculosis. We have observed that several cases of arrested tuberculosis gave strong positive fixation tests.

While heating serum at 56° C. (inactivating) destroys any natural complement that may be present, it does not, however, destroy the natural amboceptor that may be present. Inactivating serum in the Wessermann test may destroy some of the syphilitic antibodies present and thus also render the test more liable to error. Heating serum in the complement fixation test for tuberculosis may therefore also destroy some of the tuberculous antibodies present in the serum. The fact that in the original technic the amboceptor is not destroyed, and a titrated amount of amboceptor is added to the serum regardless of the amount of natural amboceptor present, proves that an excess of amboceptor is added to the serum. This may, of course, render a negative reaction when in reality it should be positive. Bearing this fact in mind we performed the Hecht-Weinberg modification in the complement fixation test for tuberculosis.

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*From the laboratories of the Prospect Heights Hospital, Brooklyn, N. Y.

[1] Due to lack of space we were unable to publish the table.

LABORATORY TECHNIC.

The blood was collected in the usual manner and allowed to clot. It was then centrifugalized and the serum was drawn off using a sterile pipette. The bloods were examined on the day that they were collected.

The antigens used in this series were: 1. Petroff's glycerine antigen which was furnished us by S. A. Petroff (3). 2. Miller's antigen which was generously given us by Dr. M. Kahn, of Beth Israel Hospital, New York. 3. Fleisher-Ives antigen which was furnished us by Dr. G. Ives.

Pritchard and Roderich (4) observed that guineapigs gave a strong positive reaction and upon investigation found that the sera of the guineapigs were at fault. The writers made complement fixation tests on all guineapigs and can therefore confirm the results of Pritchard and Roderich. We then discarded those animals that gave positive complement fixation tests for tuberculosis and used only those that gave clearcut negative reactions.

The guineapigs were bled from the heart and the sera of five or six guineapigs were pooled. The complement was then diluted one to ten using normal saline as diluent.

The rabbit antisheep amboceptor was prepared and titrated in the usual way. Two units were used throughout the tests.

The blood was obtained from the jugular vein of sheep into a widemouth bottle containing some sterile glass beads. It was then thoroughly shaken until completely defibrinated. The blood was then centrifugalized at about three thousand revolutions a minute about six or seven times. After the last time the supernatant fluid was tested for albumin using the nitric acid contact test. If there were any traces of albumin, it was centrifugalized again three times and the albumin repeated. A five per cent. suspension of sheep cells in normal saline was used.

In this work 0.85 per cent. salt solution was used. Care was taken that it was always sterile.

All glassware was chemically cleaned and sterilized. Although it is not absolutely necessary to have the glassware sterile, it was thought advisable to have it so throughout the serological work.

TECHNIC.

One unit of complement, two units of amboceptor and one unit of the antigen were used. One c. c. of a five per cent. suspension of sheep cells was used. After adding 0.2 c. c. of the serum, then the saline, complement and the antigens, the tubes were placed in the waterbath for one hour at 37.5° C. After this time the amboceptor and sheep corpuscles were added, the tubes were again incubated for one hour and then removed and read.

Technic for the modification.—Place 0.1 c. c. of the unheated serum into each of the twenty small test tubes which are placed in a special rack. Put one c. c. of the normal saline in tube 1: 0.9 c. c. in tube 2: 0.8 c. c. in tube 3: 0.7 c. c. in tube 4: 0.6 c. c. in tube 5: 0.5 c. c. in tube 6: 0.4 c. c. in tube 7: 0.3 c. c. in tube 8: 0.2 c. c. in tube 9: 0.1 c. c. in tube 10: 0.2 c. c. in tube 11: 0.15 c. c. in tube 12: 0.1 c. c. in tube 13: 0.2 c. c. in tube 14: 0.15 c. c. in tube 15: 0.1 c. c. in tube 16: 0.2 c. c. in tube 17: 0.15 c. c. in tube 18: 0.1 c. c. in tube 19: and 0.3 c. c. in tube 20.

The first ten tubes are used to determine the hemolytic index of the blood under examination. In other words, the first ten tubes are used to determine the amount of natural complement and amboceptor in the suspected serum. In tubes 11 to 19 inclusive, the actual test is carried out. Tube 20 is the serum control tube.

Now add 0.1 c. c. of a five per cent. suspension of sheep cells to tube 1: 0.2 c. c. to tube 2: 0.3 c. c. to tube 3: 0.4 c. c. to tube 4: 0.5 c. c. to tube 5: 0.6 c. c. to tube 6: 0.7 c. c. to tube 7: 0.8 c. c. to tube 8: 0.9 c. c. to tube 9: and one c. c. to tube 10.

Dilute the titrated antigens used in the original technic with equal quantities of normal salt solution.

Place 0.1 c. c. of the diluted Petroff's antigen into tube 11: 0.15 c. c. into tube 12: and 0.2 c. c. into tube 13.

Place 0.1 c. c. of the diluted Miller's antigen into tube 14: 0.15 c. c. tube 15: and 0.2 c. c. tube 16.

Place 0.1 c. c. of the diluted Fleisher-Ives antigen into tube 17: 0.15 c. c. into tube 18: and 0.2 c. c. into tube 19.

These nine tubes (11, 12, 13, 14, 15, 16, 17, 18, and 19) are the tubes in which the final reading are made and for that reason the antigen is added to them. Tube 20 being the serum control tube, receives no antigen. The tubes are now well shaken and placed into the waterbath for one hour at 37.5° C. At the end of this time the rack is removed from the waterbath and the last tube which shows complete hemolysis is the hemolytic index. For example, if tube 7 is the last where complete hemolysis occurs, the hemolytic index is 7. This means that 0.1 c .c. of serum will hemolyze 0.7 c. c. of a five per cent. suspension of sheep corpuscles.

In order to determine the quantity of sheep cells to put into 11 to 20, it has been the custom to use the same table as used in performing the Hecht-Weinberg test for syphilis. If the hemolytic index is from 1 to 4, add 0.1 c. c. of sheep cells to tubes 11 to 20 inclusive; 5 to 7, add 0.15 c. c. of sheep cells to tubes 11 to 20 inclusive; 8 to 10, add 0.2 c. c. of sheep cells to tubes 11 to 20 inclusive.

After the addition of the sheep cells to tubes 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20 the contents of the tubes are well shaken and again placed in the waterbath for one hour at 37.5° C. This rack is then removed and the results read just as in the Wassermann test.

We wish to call attention here to a modification of the Hecht-Weinberg test.

From the above table it will be observed that if a serum has a hemolytic index of 1, it will receive the same amount of sheep corpuscles in the test as the serum that has an index of 4. This, scientifically, did not seem correct to the writers. We then began trying to solve this difficulty and came to the following conclusions, which were worked out on a practical basis and proved to be more accurate and scientific than the table given by Gradwohl.

After the hemolytic index has been determined, exactly twenty-five c. c. of the sheep corpuscles are thoroughly mixed and added to twenty-five c. c. of sterile saline. This solution was termed by one of us (Blaivas) the socalled index solution.

Then, if the hemolytic index is 5, five c. c. of this index solution is added to tubes 11 to 20 inclusive. If the hemolytic index is 1, then one c. c. of the index solution is added, etc. This technic has also been employed in the Hecht-Weinberg modification of the Wassermann test in syphilis and found to be superior to the Gradwohl table. A further report of this technic will be reported later.

From our table we observed that there were thirty positive fixation tests in the original test and fifty-eight positive fixation tests in the modification. The following results were obtained:

Petroff's antigen	positive 58
Miller's antigen	positive 39
Fleisher-Ives' antigen	positive 46

In no instance was there a positive reaction with Miller's or Fleisher-Ives's antigens, and a negative reaction with Petroff's antigen, but there were many positive reactions with Petroff's antigen, and a negative reaction with Miller's antigen, Fleisher-Ives's antigen or with both.

We have therefore decided that in our future complement fixation work in tuberculosis, we will abandon Miller's and Fleisher-Ives's antigens and use only Petroff's antigen.

CONCLUSIONS.

We have reported the results of the complement fixation test in tuberculosis in 254 cases.

In twenty-one of these cases a positive diagnosis of tuberculosis was made without using the results of the blood tests. Twenty-three of these cases were tubercular suspects and six were questionable cases of tuberculosis.

Our results with the complement fixation tests may be summarized as follows:

Positive reactions in the original test	30
Positive reactions in the modification	58
Positive Wassermann tests	20
Positive Hecht-Weinberg tests	31

There were thirteen bloods that had no hemolytic index, and in those cases the modification could not be used.

Positive Von Pirquet Tests	92
Diagnosis of tuberculosis with positive reactions in original test	11
Diagnosis of tuberculosis with positive reactions in modification	17
Questionable cases of tuberculosis with positive reactions in original test	4
Questionable cases of tuberculosis with positive reactions in the modification	8
Tuberculosis suspects with positive reactions in the original test	6
Tuberculosis suspects with positive reactions in the modification	12
Diagnosis of tuberculosis with negative reactions in the original test	10
Diagnosis of tuberculosis with negative reactions in the modification	6
Diagnosis other than tuberculosis with positive reactions in the original test	7
Diagnosis other than tuberculosis with positive reactions in the modification	23
Diagnosis not made, with positive reaction in the original test	1
Diagnosis not made, with positive reactions in the modification	2
X ray of chest positive, with positive reactions in the original test	3
X ray of chest positive, with positive reactions in the modification	5
X ray of chest positive, with negative reactions in the original test	5
X ray of chest positive, with negative reactions in the modification	1

We have shown that twelve tuberculosis suspects gave positive reactions, seventeen cases of tuberculosis gave positive reactions and five cases with positive x ray findings gave positive reactions, whereas only six cases of tuberculosis gave negative reactions.

COMPARATIVE VALUE OF TESTS.

From our results with both tests it will be noted that the modification of the complement fixation test in tuberculosis is much more sensitive than the original technic. We always get a greater percentage of positives in the modification and in known cases of tuberculosis the modification gave almost fifty per cent. more positive results than did the original test. In known cases of tuberculosis there were forty per cent. more negatives with the original test than with the modification. We will therefore continue using the modification of the complement fixation test for tuberculosis in conjunction with the original test.

We also wish to state that in our experience there seems to be no crossfixation in syphilis.

From the summary, we conclude that we have obtained some valuable information from the complement fixation in tuberculosis. Not only is it an aid to diagnosis, but where there is a positive result, the clinician should go further into the case using every known method to establish an accurate diagnosis. If it has done no more than make the physician more careful, more observing, and more accurate in diagnosis, the test has achieved a definite place in medicine if used properly.

We wish to express our thanks to Dr. J. L. Sengstack for his valuable aid in this work.

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Tuberculosis and Poison Gas*

By A. P. FRANCINE, A.M., M.D.,
Harrisburg, Pa.,
Lieutenant Colonel Medical Reserve Corps; Chief of Division of Tuberculosis, Pennsylvania State Department of Health.

To be understood I must first give you a picture of poison gas as it was during the last four months of the war following the formation of the First American Army. Not as it is popularly imagined to be, or may have been. The experience on which my opinions are based consists of four months' service as consultant in gas to the Fourth Army Corps in the St. Mihiel and Argonne sectors, six weeks of which was spent as resident Physician-in-Chief to the great gas hospital at Toul. It therefore concerns only the effect of gas as I saw it on American troops at a time when gas discipline was generally good and our type of gas mask effective. The effect of the only gas which I will consider is mustard gas, because it was almost exclusively used and had become recognized as the most effective of all battle gasses in producing casualties.

It should be understood that socalled mustard gas is not what many people would consider a gas at all, but is a heavy oil thrown in shells. Great extent of terraine can be contaminated for long periods of time, as long as ten days to two weeks, particularly in damp, wet, low lying fields or woods. It volatilizes with difficulty and only under warm sunshine. When it volatilizes it is detectable by odor. Any troops going into such areas, or sleeping there, are burned (gassed). It is usually not inhaled at all. Its action is escharotic, like ivy poisoning, if you will. Burns take some time to appear; often twenty-four hours.

So that when I think of the hundreds of men littered into the hospital every night or so, I do not picture men who were coughing, choking or gasping for breath, for they were not; but of cold, exhausted, quiet men, burned more or less severely about the eyes and body. Approximately eighty per cent. of our cases were suffering from mustard gas. Seventy-five per cent. of these were not severely gassed, and of this number twenty per cent. were probably not gassed at all but were victims of exhaustion, shell-fume, and other conditions.[1]

Other types of gas like phosgene and chlorine are vastly more deadly but are only effective in such high concentrations; hence in such a restricted area as to be very ineffective as compared with mustard gas. It is vastly more important to put two hundred men permanently out of the lines (only slightly injured though they may be), than to kill five men outright.

That is one reason why the later use of gas was infinitely more humane than shot and shell. In only about twenty per cent. of admission was the condition severe enough to confine the men to bed for more than forty-eight hours.

DIAGNOSIS.

Diagnosis was usually evident on admission, though 191 cases were classified (erroneously I believe) as due to phosgene. None of these patients showed pulmonary complications, except a few râles which soon disappeared. None of these patients died.

TREATMENT.

Treatment was simple, carried on by medical officers, nurses, orderlies and convalescent comrades. I was particularly interested in studying the chests of these men and went over hundreds of them with care. In the majority there were no clinical findings whatever. In some there were râles; apparently from the history, the result of an already existing bronchitis. These often cleared up after a day or two of rest in the hospital. The same is true of coryza. In a few patients whose lungs were clear on admission there developed influenza or bronchitis, which appeared possibly due to cross infection, so beds were cubicled to prevent this.

Except in relatively few cases I could attribute no possible relationship, and at no time anything of a permanently damaging nature to the lungs from gas. In other words they had not inhaled the fumes, or very slightly. There was little more in these chests than one would encounter in any general medical ward, and not as much as one would find in a clinic devoted to diseases of the chest. There was no active tuberculosis noted. No tubercle bacilli were found in those who had expectoration, not even in the few who had râles and for some days blood streaked sputum.

CAUSE OF DEATH.

The percentage of deaths in the gas hospital was 1.98 per cent. All the deaths were from mustard gas. This percentage again goes to show that the mortality and effects of gas have been, as was to be expected, greatly exaggerated and misunderstood in the minds of laymen, soldiers, and doctors, who did not study it closely and among large groups. This is to be understood as relating to the later months of the war, when gas defense had become well developed.

A few died directly from prolonged inhalation of the gas, or in great concentration. At autopsy the bronchial tubes were found seared as with a red hot iron and the lungs were bloody sponges. It might be argued that sufficient time had not elapsed for the lighting up of a tuberculous process. However, death occurred among a number of men who were badly burned about the body who had inhaled gas and who had been in the hospital from five to seven weeks. They were sick, weak, but improving; and each patient died from an intercurrent infection such as, myocardial insufficiency (asthenia), nephritis, or from acute influenza (bronchopneumonia). No evidence of reactivation of existing tuberculous lesions was found in these cases at autopsy.

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* Read before the National Tuberculosis Association, Washington, D. C., May 6, 1922. My paper being limited to ten minutes must necessarily be brief, and to an extent incomplete.

[1] Report for hospital kindly furnished by Major A. G. Love, M. C., U. S. A. Exact statistics are not available for a number of reasons, i.e., the uncertain hour and hurried nature of admissions and evacuations, lack of personnel, etc.

The skin burns healed rapidly and these men were evacuated to base hospitals usually in from four to seven days. Their chests were carefully examined before evacuation and their lungs were clear, or there was only a mild bronchitis, in practically all instances. Some who were slightly gassed and in good physical shape were returned after a few days' rest to their organizations in the line.

MENTAL SHOCK.

I believe, however, that there was a certain mental shock from having experienced in even a slight degree, a touch so to speak, of this little known and dreaded gas. This I know to have been the case in the production of aphonia in certain cases, purely neurotic in origin; which has yielded to appropriate treatment. There may have been other resultant effects with which I am not familiar, but certainly none of a pulmonary character. It seems, however, true that a man who has once been gassed has come to attribute (whether sincerely, or through ignorance, or not) any illness, from pain in the chest, shortness of breath, acute bronchitis, or tuberculosis, to his gassing.

A number of such cases which I have personally examined were found never to have been gassed at all. In some instances they were taken for a night to one of the advanced triages, or field gas hospitals for observation, and returned to the lines without evacuation. They had never passed through the evacuation gas hospital of the justice group (Toul) as they would have had to do were they really gassed at the time they specified.

That gas, as I saw it, from the point of view of one who had had considerable preliminary experience in conditions of the chest, could leave any damaging effects, not only on the lungs, but elsewhere, is inconceivable, as the injuries were usually so slight. I have been informed informally, however, that the Veterans' Bureau is paying for disability indirectly attributable to gas about twenty per cent. of its disbursements.

I have only attempted to give you my personal impressions mellowed by medical experience in civil life. Brigadier-General Amos A. Fries, Chief of the Chemical Warfare Service, has dealt with this subject in a masterly and interesting way, as has Colonel H. L. Gilchrist and Colonel James Robb Church. Let me quote from a paper by General Fries:

"According to the report of the Surgeon General, United States Army, for 1920, 258,338 men were injured during the war. Of these 34,249 died on the field of battle and 13,691 died in hospitals. There were admitted to the hospitals (this does not include marines) 224,089. Of this number, 70,552, or 27.3 per cent., were suffering from gas alone. Of the 70,552 gas cases, only 1,221 died. Of the 153,537 admitted to the hospitals suffering from bullets, high explosives, and other methods of war except gas, 12,470 died. Of those killed on the field of battle, we know that very few—probably under 200—were from gas, since concentrations of gas sufficient to kill within say twelve hours were seldom obtained. If we assume that 200 died from gas on the field of battle, the total deaths from gas would be 1,441 out of 70,752, or less than two per cent. In like manner, of the 187,586 injured by bullets, high explosives and similar methods, 46,449, or more than twenty-four per cent., died. Thus it is evident that the man who was injured by gas alone on the field of battle had twelve times as many chances for recovery as the man wounded with bullets and high explosives."

"Other comparisons are still more striking. On page 21 of that report we are told that eighty-six men were totally blinded in the war, forty-four were partially blinded in both eyes, and 644 were blinded in one eye. These include eyes destroyed or those in which the sight was lost. Of the gassed patients, it is stated that four were blinded in both eyes and twenty-five in one eye, a total of twenty-nine. These twenty-nine were 3.85 per cent. of all those suffering blindness in one or both eyes. In other words, bullets, high explosives, and other methods of warfare than gas were responsible for twenty-five times as many blinded as were gassed."

CONCLUSIONS.

Concluding, from my experience during the last four months of the war, when there was intense use of gas:

1. The terrible impression people have of gas arises from its early, tragic, inhuman, and indefensible use against troops, surprised and defenseless before this untried but potent offensive weapon. This contrary to the Hague Convention.
2. People generally, including the rank and file of Army men, have a much distorted mental picture of its effects, and begin by thinking of it as of the nature of deadly fumes. Generally speaking it is nothing of the sort. The effects of gassing (mustard) are in the majority of cases superficial eye and body burns.
3. Mustard gas is the most effective of all battle gases in being the greatest casualty producer, and hence was by far the most widely used. It is rarely inhaled. It is a burn.
4. The percentage of deaths from gas was both absolutely and relatively extremely low; and of permanent disability (blindness) negligible.
5. Poison gas put more men out of action with less hurt to the individual than any branch of the service.
6. Following the perfection of methods of defense against it, it became many times more humane than shot and shell as proven statistically above.
7. Anyone who saw closely the use and effect of gas would far rather be exposed to a gas attack than take a chance with a half inch of red hot flying steel.
8. One might even be excused for characterizinz it as benign to the extent, that it put so many of our men (nearly seventy thousand) out of the war with usually slight and temporary injuries, who would otherwise have continued to be exposed to the damaging effects, severity, and cruelty of gun fire. Of course, it may be objected that the lines were kept filled by replacements, and while measurably true, yet gas at least saved these particular gassed men.
9. It would appear incapable of leaving any pathological aftereffects. It is inconceivable that gas (as it is, and not what so many people consider it to be, or what it may have been) could reactivate tuberculosis, and available statistics and majority expert opinion go to prove that it does not do so. This view is endorsed by French, British, and other authorities.

Shall We Tell Our Tuberculous Patients the Truth?*

By ARNOLD MINNIG, M.D.,
Denver, Colo.

On the face of it the question seems silly, but practically it is a question which is constantly proposed for solution and one which the physician must decide with nothing but his own knowledge and experience to guide him. Shall we tell the hopeless third stage patient who is bravely battling for his life that his fighting is all in vain, that he has no chance, and take away hope, the only thing that is left him? Shall we tell the nervous, emotional, self-centered woman—or man—who is in the incipient stage that she has tuberculosis, and let a disordered, egoistic imagination frighten her—or him—into a more advanced stage of the disease? On the other hand, shall we let the patient in an advanced condition do unwise things for want of complete knowledge of his condition, or the foolish woman—or man—forego the benefit that intelligent guidance could give? It seems such a simple question—shall we or shall we not tell the truth?—but like many other apparently simple problems, it is exceedingly difficult to solve.

Let us examine some of the principal reasons for telling or withholding the truth. Innate honesty and care for one's reputation naturally prompt one to speak the truth, but even here the welfare of the patient must be the first consideration. A reputation for truthfulness is the greatest possible help in winning and retaining the confidence of patients. But the most important reasons for frankness are—to enlist the intelligent cooperation of the patient, and to keep him from doing harmful things. Many patients will not observe proper precautions until they are thoroughly frightened, but this is a healthy scare and rarely does harm.

The reasons against telling the patient of his true condition are, first, the fear that the dread word tuberculosis inspires, and unfortunately this is not a healthy scare; secondly, the danger of discouraging the patient, taking away his greatest comfort and most powerful weapon—hope. Even if the case is hopeless, surely it is better to die fighting than to give up in helpless despair.

The problem is purely a psychological one. It has disturbed me for years, and I do not feel because I am talking about it that I know the solution. It is also an individual problem, that is, each case must be treated individually according to the mental make-up of the patient. We adapt the dose of medicine to the physical size and weight of the patient, we must adapt the mental treatment to his mental and moral size and weight. The big, flabby, two hundred pound man who collapses at the mention of tuberculosis must be treated like the overgrown baby that he is, and given his pills thickly sugar coated and in as small doses as possible, while the quiet, self-contained person who can face facts squarely can be told the plain truth without fear of untoward consequences. This type will appreciate the frankness and honesty of the physician, while reticence would arouse suspicion and mistrust. These are only two of innumerable types and each one must be treated according to his kind. A thorough working knowledge of psychology is essential to the success of a physician.

One thing that physicians often fail to realize is the belief of a not inconsiderable part of the public in the incurability of tuberculosis. It is not many years since the medical world held the belief that tuberculosis was incurable. We now know that it is one of the most curable of diseases, that most people at some time in their lives have had some form of it. But knowledge percolates slowly from the classes to the masses, so a large number of people still believe that the disease is incurable. This impression should be removed not only from the minds of patients but of the public as well. This would remove much of the fear, and greatly simplify the work of the physician.

So what is the solution of our problem? Shall we tell patients the truth? Decidedly, yes! Why? Tuberculosis is a disease with a marked tendency to recovery. The whole Rocky Mountain region is here as evidence of its curability. We can therefore speak encouragingly as to the prognosis in the majority of cases. People prefer encouragement to discouragement.

Furthermore, we are not always sure of our prognosis. Time and again all of us have predicted an early end of patients who have surprised us by getting well or at least have lived much longer than we expected. This is the exception rather than the rule, but it does occur.

If we eliminate hope from our treatment we have taken away one of our strongest natural weapons of defense. On the other hand, in order properly to defend themselves patients must know the truth. How can a patient intelligently combat a trouble without knowing what it is?

When one sees year after year the mistakes patients make and how they might be avoided, and finally can pick out, as most specialists in lung diseases can, the patients who are going to get well and those who are going to die, the need for more forcible arguments and a more convincing exposition of the case, becomes tragically greater. We are not always able positively to say that one case will live and the other will die, but as a rule, we can.

I know of no more impressive place to see the tragedy of the errors of the consumptive than in the free tuberculosis dispensaries.

We see them come from the East penniless or nearly so. Often as soon as they arrive they feel better, due to the bracing, exhilarating effect of our altitude and wonderful climate. It may be that in the East the patient was unable to work—in fact, was a bed patient, but soon after coming West he feels so much better he thinks he can climb the mountains, which he often does with disastrous results.

As I so often tell patients, if we had an index such as breaking a leg the minute tuberculous activity starts, the patient might pay attention to the seriousness of his case. Most people not breaking their legs at this particular time we do not have this index. In fact, we have no index except the physician's opinion, and that opinion may be ever so good, yet the patient when he first hears the news that he has tuberculosis is not satisfied and often does not believe it. He then goes to another doctor, several it may be. I recently saw a patient with advanced pulmonary trouble who was told by seven doctors that he had lung trouble, so he went to an eighth who told him he had none. He stayed with the eighth longer than with any of the others. Patients always insist that they want to know the truth of their condition, but they are often unwilling to accept the verdict.

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*Read before the Medical Society of City and County of Denver, May 2, 1922.

I remember one case which was especially impressive. The patient was a woman of thirty-two. She had been a business woman before and after she was married. She seemed the wiry type, but at last she became so exhausted at her work that she had to give it up. She came to me with the admonition that she did not want to be examined unless I told her the truth. I examined her and proceeded to tell her my findings. I told her the truth. I told her that I thought she had had tuberculosis for some time. However, there was no sputum and the x ray was negative. At this examination there was no rise in temperature. What was the result? I did not see the patient again for a year. During the interval she had seen several doctors, who assured her after repeated examinations that her lungs were all right. Some time after I examined her she had a hemorrhage. The doctor and patient were finally convinced. A year later she returned to me. She now thinks I know my business and even tell the truth.

About two years ago a patient from the East came to the tuberculosis dispensary. He was not able to work back there, but felt better as soon as he came here. We told him he had advanced tuberculosis and should not work. Forthwith he started to work and worked fairly regularly for a year. He then came again to us. Examination revealed hopeless progress of the disease yet the patient complained of nothing except some shortness of breath. Telling the truth does not always produce the desired effect.

Another instance is rather typical of many others. A man and his family came here from the East. I was called the next day. They wanted to know the truth and what my advice was as to treatment. I told the wife her husband was going to die soon and that they had better go back home as soon as possible. I was discharged. The patient died in ten days.

The thing does not always work so badly for the doctor. I have at present a patient who has been going to a quack woman physician who said she could be cured in ninety days for two hundred dollars and that she would guarantee the cure. This was a third stage case. At the end of the ninety days the patient was assured she was well. Not recognizing any of the symptoms of wellbeing, strange as it may seem, she became suspicious and did not enjoy the sensation of being stung. She heard from a neighbor that I had the reputation of telling the truth, so she came to me and has stuck, although she was hopeless when she came.

It does seem discouraging to see on all sides quacks and charlatans assuring patients that they can cure tuberculosis and fraudulently extracting all their money. A case I had a number of years ago will illustrate my point.

A man with his wife and children came here from Minnesota. During the influenza epidemic they were all ill except the man for whose health they came. He nursed them all. On examining the man I found a large cavity in one apex. He was a well advanced third stage case. The money was beginning to run out and they moved to the suburbs. I took care of this man for about two or three years for nothing and about a month of this time I put him into the County Hospital on account of a hemorrhage. They represented to me that the sole support of the family was the mother, who was working at a local dry goods store at fifteen dollars per week. I called on the city charities and the visiting nurses' association. For several years we all worked together on the man and the family. Recently I saw the man on the street hobbling along with a cane, almost unable to walk. He told me he had been up to see a woman doctor who was giving him electric treatments and was curing him.

My plan nowadays is as good as any I know. People say they want to know the truth, but do they? I feel that the honorable medical man must direct these unfortunates in the right way. The first essential is to gain the patient's confidence. This is not usually possible at one visit, but it comes after a while. Then, pointing out the hopeful prognosis of many of these cases and how it is the tendency of the disease to get well, we must in as attractive form as possible according to the case, and as fast as possible point out with firmness the reality, that it takes many months or a year or two, it may be, for the patient to get well and that it is his duty to make a fight. There will not be much trouble with the patient who cooperates and does well, but with him who does not get along it is indeed a hard job to keep driving old man gloom from the door.

The issue at stake is a human life. Patients are not mental defectives and should not so be treated. In most cases, therefore, we can conscientiously give them encouragement. That is what they want. Therefore it is acceptable. On the other hand we must also tell them the facts as we know them. Indeed, it would be a crime for the medical man not to do so. It is only after the patient learns the unvarnished truth that the physician can enlist his aid and cooperation in the business of getting well.

In conclusion, I should say that the medical man who does not tell his patients the truth is guilty of a crime just as truly as any criminal is guilty. The doctor who puts his truth in as attractive form as possible is doing this class of patients the greatest amount of benefit. To do this he must first gain the patient's confidence, then slowly but surely put him face to face with the truth. If he then leaves us we have done our part. We have upheld the honor of the profession if we have done the very best as we see it. We shall have done something worth while, and with time will be rewarded by a profitable following and, best of all, by a clear conscience.

Abscesses Descending from the Upper Air Passages*

By OTTO GLOGAU, M.D.,
New York,
Honorary Member Austrian Otological Society.

In the *Festschrift* to Prof. M. Hajek's Sixtieth Anniversary (November, 1921) and in the July, 1922, issue of the *Laryngoscope,* I have in detail described the typical external operation for the abscesses descending from the upper air passages. Through the courtesy of my esteemed teacher, Prof. M. Hajek, I worked last summer at his clinic as aspirant and had thus an opportunity to evolve this method, basing it upon studies made on the cadaver, on the observation of cases operated upon during my stay at the clinic and upon the perusal of the records.

I will report three cases where I have used this method, since my return to this country, and will point to the one case previously operated upon in a similar way. The abscesses descend from the upper air passages and the base of the tongue, that lead to phlegmon of the neck and to affections of the mediastinum, originate mainly from angina of the faucial tonsils, tonsillar and peritonsillar abscess, following tonsillectomies, following phlegmon and erysipelas of the pharynx, following laryngeal phlegmon, following foreign bodies, as secondary descending abscesses, which originate after lues, tumors, infections of the teeth, the jaw, the sinuses and other affections of the upper air passages and their adnexa.

The operative method recognized by me as a typical one bases upon the topographical and anatomical conditions, as they decide in every case the path along which the abscess may descend. It is evident that all inflammations originating in the neighborhood of the pharynx, the tonsils, the base of the tongue and the laryngeal region descend into the loose connective tissue interstices of the neck that surround the pharynx. Consequently, however different the places of origin may be, all these descending abscesses act in their further course analogously and furthermore may be reached by one and the same method.

To illustrate the operative procedure I have had made three pictures that demonstrate the different steps of the operation. The first picture shows the skin incision that reaches alongside the anterior margin of the sternocleidomastoid from the level of the mandibular angle to the jugular fossa.

The second picture illustrates the exposure of the collar mediastinum. From the lower part of the incision, through the superficial fascia of the neck, the vascular sheath is reached by blunt dissection, and the anterior margin of the vessels is located without further dissecting the vessels. Then the omohyoideus is divided. Following the course of the vessels, the anterior collar mediastinum is exposed and sealed with a drain of iodoform gauze tampon, as is also seen in the picture. The thyroid gland is now moved forward and towards the median line without injuring its capsule.

By lifting the thyroid gland, the posterior collar mediastinum is exposed, and simultaneously the wall of the esophagus and the vertebral column appear.

The operative procedure up to this point is carried out both in the presence of a healthy and of a diseased mediastinum; in the first case to seal the healthy mediastinum by iodoform gauze tampon against the possible progressive tendency of the pus (prophylactic mediastinotomy of Marschick), and the second case to drain it.

The third picture demonstrates the operation proper, which can only be attempted after the sealing or draining of both collar mediastinal spaces. At the upper part of the incision, along the sternocleidomastoid, one progresses towards the depth, guided by the inner margin of the vascular sheath. This picture represents a certain individual instance of the typical operation, dealing with the drainage of abscesses descending from the lateral pharyngeal wall, especially the tonsils. The lower belly of the *digastric* serves as a topographic line of orientation. Within the vascular sheath the common carotoid artery and its division into the external and internal branches may be recognized. Caudally from the digastric the hypoglossus nerve is located. In the space beneath the digastric as is indicated in the picture, a dressing forceps is introduced into the direction of the mandibular angle and is pushed upward into the parapharyngeal space, beneath the mucous membrane of the pharynx, and spread open into different directions (subbiventral method). If we have to deal with the opening and drainage of abscesses localized elsewhere within the upper air passages or at the base of the tongue we must, in every individual case, differ from the described type of operative procedure, according to the exactly localized place or origin of the abscess.

By previous pharyngoscopic examination we determine, as well as possible, the location of the abscess and the level at which it originated, and which special way the suppurative process took in the course of its progress.

The operative method described above was successfully applied in the following three cases:

Case I.—Ch. T., eleven months of age, was referred to me on February 2, 1921, by Dr. Charles F. Fisher, of Brooklyn. The child was born in the United States. The parents were Russian and had always been in excellent health. The child was breast fed and got its first teeth at six and a half months. The present sickness was the first one the baby suffered from. About three weeks before, the baby cried all night, the mother gave it castor oil and a soap and water enema, without avail. The next day a physician was called who found a temperature of 104° and rapid pulse. He also noticed a swelling on the left side of the neck. The doctor suspected peritonsillitis and prescribed a mouth wash and internal medicine. As the child's condition grew worse, an ear specialist was called who opened both drum membranes, an x ray picture was taken but proved to be negative. The child's condition grew constantly worse. A specialist was then consulted who thought that an abscess was forming somewhere but could not locate it. Meanwhile the child started to choke, especially at night, and would not take the bottle, and if forced to do so would vomit immediately. Another baby specialist was consulted who stated that the stomach was out of order and prescribed a special diet. The baby grew weaker, the breathing became more obstructed. The temperature showed a daily range from around 99° to 104°. During the last few days the child had chills. Dr. Charles F. Fisher, who saw the child in the morning, suspected a deep abscess in the neck and referred the patient to me.

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*Read before the Meeting of the American Academy of Otolaryngology, Minneapolis, September 21, 1922.

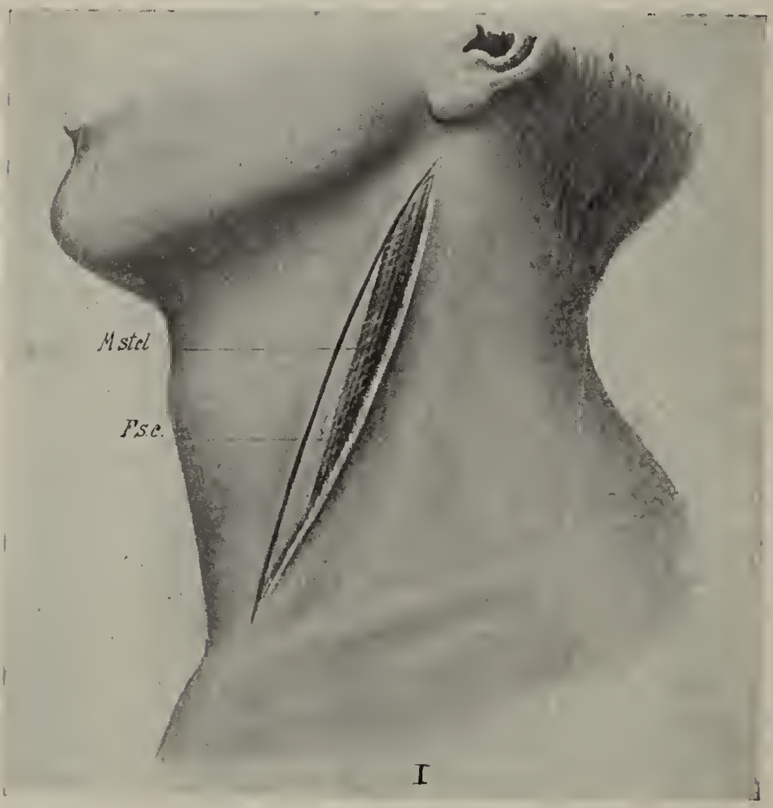

Fig. 1.—Showing skin incision.

The baby was well developed, extremely pale and apparently very ill. It was gasping for air and slightly cyanotic. When given the bottle, it vomited immediately, temperature 104°, pulse 100. Local examination revealed no apparent pathological change within the throat, with the exception of a marked redness at the base of the tongue, at the region of the vallecula. Digital examination revealed a fluctuating swelling on the posterior wall of the esophagus, starting at the level of the arytenoid cartilage and apparently reaching far downward. On the outside there was a dense infiltration noticeable on the left side, at the anterior margin of the sternocleidomastoid, starting from the mandibular angle and reaching down to the larynx. The swelling was slightly discolored and sensitive to pressure. There was a special sensitiveness to pressure present at the region of the jugular fossa. Heart and lungs were apparently normal.

A diagnosis of descending retroesophageal abscess with phlegmon of the neck and threatening mediastinitis was made. Immediate operation was advised. The operation was performed at the Lane Sanatorium, February 2, 1922, at 1:30 p. m. Dr. Levengood assisted, Dr. Lane was the anesthetist. Superficial ether narcosis was given.

The incision was made alongside the anterior margin of the sternocleidomastoid muscle, from the mandibular angle to the jugular fossa, ligation of the superficial vessels, blunt dissection made alongside the anterior margin of the muscle to the depth of the vascular sheath, whose anterior margin is located, without opening the sheath proper. At the lower aspect of the wound the omohyoideus was severed. Following the inner margin of the vascular sheath downward, the anterior mediastinum was exposed. It was found normal and sealed with iodoform gauze tampons. The thyroid gland was then pushed forward and towards the median line, without injuring its capsule. By lifting the thyroid, the posterior mediastinum was exposed. As it was found to be in a healthy condition, it was sealed with an iodoform gauze tampon. Having protected both the anterior and posterior mediastinum (prophylactic mediastinotomy of Marschick) the abscess cavity was searched for at the upper aspect of the wound. Here, too, the inner margin of the vascular sheath was located; but the tissues were hard and indurated, and it was impossible to continue working towards the depth by means of blunt dissection. It looked rather daring and desperate to use a knife so close to the carotid artery. But the preceding pharyngoscopic examination pointed the way. At the level of the cricoid cartilage, the indurated mass was incised right close to the anterior margin of the vascular sheath, about one millimetre from the carotid artery. The larynx was grasped with the left hand and pulled outward. When the incision had been carried about one cm. further towards the depth, there gushed forward under high pressure about five ounces of creamy, foul smelling pus. Starting from this point, the indurated mass of tissue was then opened further upward and downward by means of the finger. Digital examination of the abscess cavity showed it to be about two and a half cm. in width and eight cm. in length. The vertebral column could be clearly felt beneath its fascia, but no roughness pointing to bone affection could be noticed.

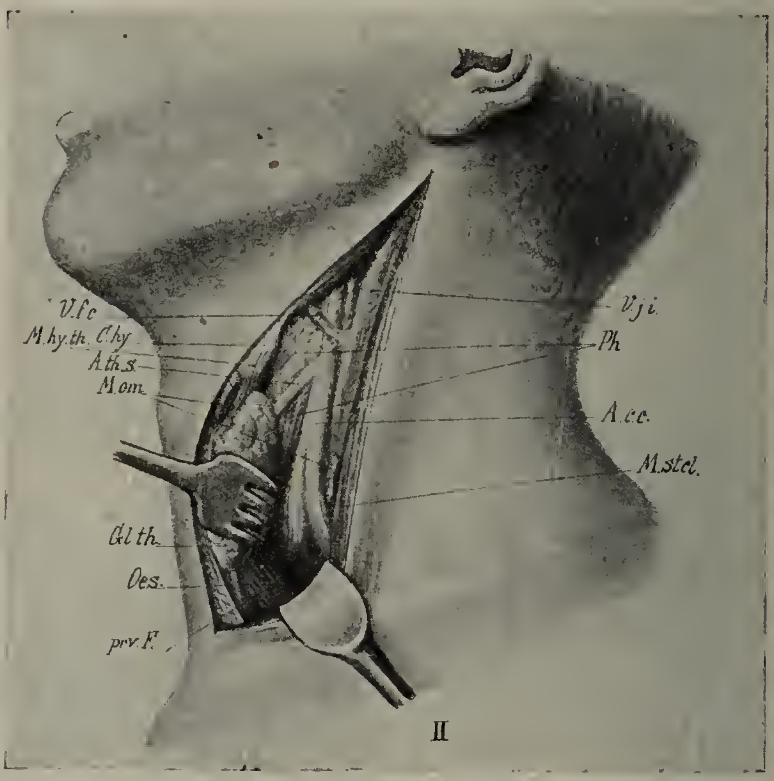

Fig. 2.—Illustrating the exposure of the collar Mediastium.

Two cigarette drains were introduced into the abscess cavity and the wound left open. Immediately after the operation the child's condition showed a remarkable change. The same evening it sat up in bed, breathing normally, it asked for the bottle of milk which it emptied without difficulty. The temperature dropped within a few hours and the pulse improved with it. The night after the operation the child slept quietly. The outside dressing was changed every day. On the fourth day the mediastinal tampons were removed and on the fifth day the two cigarette drains, as there was no more discharge whatsoever present. With the removal of the drain a slight irritative cough stopped, which was due to the pressure of the drain towards the larynx. On the sixth day the child was dismissed from the sanatorium as cured. After one more week the wound had entirely healed by secondary intention.

Case II.—Represented a similar condition in an adult. S. H., thirty years old, was referred to me on April 11, 1922, by Dr. Mark I. Schoenberg, of New York City. Twelve days previously the patient caught a cold and immediately noticed a swelling on the left side of the neck. This swelling, however, disappeared, but came back four days later. Since that time the patient has felt a choking sensation, had pain in swallowing and experienced shooting pains toward the head, back and arms, and could not open his mouth very well. He was gasping for air. He had a subicteric discoloration and was apparently sick.

There was no apparent inflammation present at the tonsils, base of the tongue, or pharynx. Laryngoscopic examination revealed, at the level of the posterior laryngeal wall, at the left side a forward bulging of the esophageal mocous membrane. There was severe pressure pain along side of the anterior margin of the left sternocleidomastoid at the level of the thyroid cartilage. At the right side the same pain was elicited but only on deeper pressure. The patient held his head stiff and inclined to the left side. There was a diffuse infiltration present in front of the left sternocleidomastoid from the mandibular angle to the larynx. Swallowing was extremely difficult. The patient was cyanotic. There was severe tenderness to pressure present in the jugular fossa.

A diagnosis was made of a descending retroesophageal abscess with phelgmon of the neck and threatening mediastinitis. The patient was operated upon at the Community Hospital, Dr. Hoiland and Dr. Grove assisting, anesthetist Dr. Hraba. The operation lasted from eight to nine p. m. Superficial ether narcosis was given. The incision was made along side the anterior margin of the sternocleidomastoid from the mandibular angle to the jugular fossa. By blunt dissection, especially with the finger, at the lower margin of the wound, the anterior mediastinum was opened and sealed with iodoform gauze tampons. The thyroid gland was then pushed forward and the posterior mediastinum exposed and sealed in the same way. At the level of the cricoid cartilage a solid mass of indurated tissue was found in front of the vascular sheath together with enlarged and degenerated glands. First by blunt, and then by sharp dissection, it was worked towards the depth. In front of the carotid artery, without opening the vascular sheath, the retroesophageal tissue was reached and about six ounces of foul, yellowish creamy pus evacuated. Digital exploration showed a large cavity between the fascia of the vertebral column and the fascia of the esophagus, reaching downward about five cm. and encroaching upon the other side. The wound was left open except for two stitches at the ends. A wet dressing was applied.

Due to the bad breathing of the patient I was ready to tracheotomize him at any moment. The anesthetist remarked that the instant the pus was evacuated the patient's color immediately changed to normal and his breathing improved remarkably. The narcosis was a superficial one and the patient soon after the operation cried out, "Oh, I feel so much better." The next day he smoked cigarettes and ate three hearty meals; he did not complain of pain any more. The outside dressing was changed every day. The mediastinal gauze strips were removed on the fourth day, the cigarette drains of the abscess cavity on the sixth day. On the eighth day after the operation the entire wound, which had been left open, was closed by secondary suture, with the exception of a small central space where a small drain was left. After one more week the entire wound had healed.

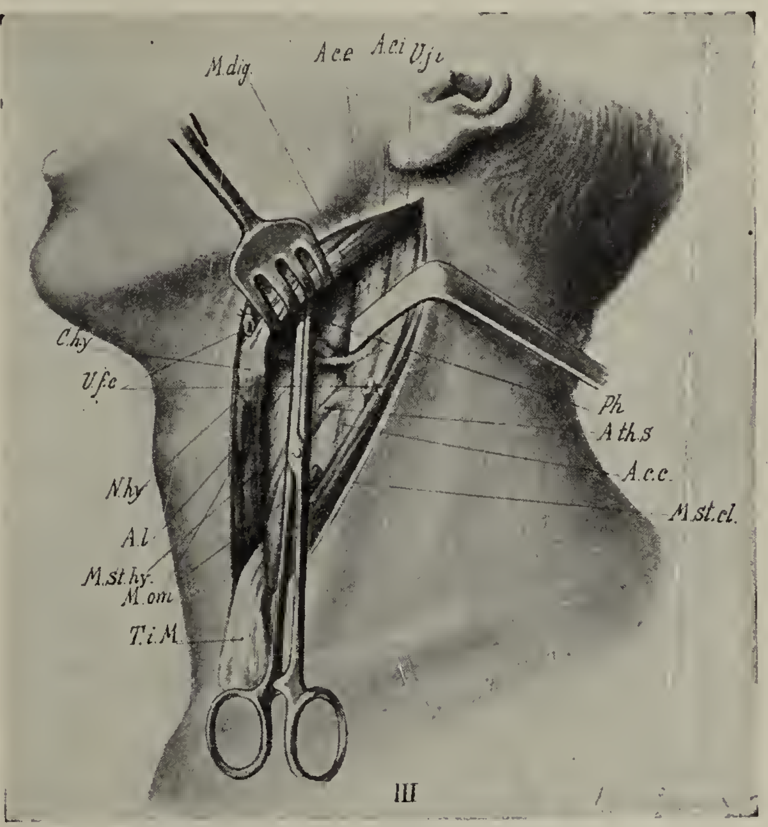

Fig. 3.—Illustration of the operation.

(Owing to lack of space it was impossible to include the author's two other cases.)

The typical operation reaching the original suppurative focus alongside the course of the vascular sheath is a logical procedure because it corresponds to the topographical anatomical condition. It should always be combined with opening of the mediastinum (collar mediastinotomy), followed by sealing or drainage of the same, depending upon whether it is in a healthy or diseased condition. At the early stage, conservative treatment may be tried, such as local antiphlogistic therapy, incision within the upper air passages, or, at times, also external incision without opening of the mediastinum. The patient must, however, be most closely observed and one must be ready to immediately perform the typical operation in case of emergency.

If the topographical anatomy of the region is mastered, the technic is simple. Acting under correct indication, and if the operation is performed in time, the result is always favorable. The typical external method for the relief of abscesses descending from the upper air passages should be preferably performed by the well trained rhinolaryngologist, who is thoroughly orientated by the all important pharyngolaryngoscopic examination and by his knowledge of the topographical anatomy.

Since I read my first paper on the subject before the Section on Laryngology of the New York Academy of Medicine, and especially since its publication in the *Laryngoscope,* I received numerous communications in regard to the fatality of these complicated and dangerous descending abscesses, when treated by the old methods. Fatal descending abscesses were reported by dentists (extraction of teeth and dental infection), otologists (mastoiditis, etc.), rhinologists (tonsillitis, peritonsillar abscess, phlegmonous affections, foreign body, and other conditions), and general practitioners (lues, tumors, and other conditions). It is my hope that through my endeavors a stimulus has been given to the profession for an early diagnosis and appropriate treatment of this life threatening condition. An apparently simple case should not be trifled with, and even a desperate one should be given a chance of the typical operation. This method is submitted to the general and rhinological surgeon for a fair trial, to pass upon it in cool judgment. Thus a measure concepted and advocated in enthusiasm will gradually find its right place in our armamentarium towards human sufferings.

64 EAST NINETY-FIRST STREET.

Climate in the Treatment of Pulmonary Tuberculosis*

By H. SCHWATT, M.D.,
New York,
Attending Physician, Tuberculosis Division, Montefiore Hospital for Chronic Diseases, and Bedford Sanatorium.

The belief in the therapeutic value of certain climates in the treatment of pulmonary tuberculosis has come down to us from time immemorial and, not unlike other beliefs founded upon faith and hope, has survived the mutations of the centuries. In our own country the opinion has become firmly implanted in the minds of the profession that there is something in the atmosphere of the valleys and mountain heights of the western climates that has a specific curative effect on the disease. That this is so is evidenced by the large number of consumptives who are advised to go there irrespective of the stage and activity of the disease, of its complications and of many other factors important in its treatment.

A number of years of experience in charge of a sanatorium for consumptives in Colorado has led me to believe that the practitioner in the east has not given the question sufficient thought and investigation and is thereby perpetuating a routine belief in the specific influence of certain climates, than which there is nothing more harmful.

There is considerable disagreement on the value of climate among men of wide experience in the treatment of tuberculosis. It is significant, however, that the division of opinion is largely limited by geographic lines, that is to say, that the great majority of the protagonists of certain climates are residents of these climates. It has been said that an honest paper on this subject still remains to be written and that a great deal of the glowing praise of certain climates in pulmonary tuberculosis is dictated by commercial interest. There is no doubt, however, that there is a tendency perfectly compatible with honesty of opinion to ascribe to the climate in which one lives particular therapeutic values. On the other hand, the rapid multiplication of sanatoria, within recent years, in climates for which no particularly brilliant claims have ever been put forward speaks for the conviction that altitude and other favorable climatic features of certain regions of the west are no longer to be considered of importance in the treatment of the disease.

Climate is a complex conception and is composed of many factors such as temperature, amount of sunshine and rain, dryness and humidity, frequency and velocity of winds, elevation above sea level, and the presence or absence of atmospheric impurities. The ideal climate for the treatment of tuberculosis would be one of comfortably cool temperature with moderate diurnal variations, a dry atmosphere with gentle breezes, free from impurities and at a moderate elevation. If we analyze the various climates recommended as of especial therapeutic value, namely, the high and arid regions of Arizona and New Mexico, the high altitudes of Colorado, and the varied climate of California, we find that they differ considerably and that none of them is characterized by uniformly favorable weather conditions throughout the year, nor throughout the day.

Admitting, however, that these regions offer favorable climatic conditions for a maximum opportunity for outdoor life, so universally recognized as of great importance for the consumptive, there is one factor common to the most popular of these which, as Fishberg (1) has so aptly put it, is "like a double edged sword," and of which I wish to speak in particular, namely, high altitude.

It has been asserted that high altitude is the greatest desideratum and the best single weapon in the treatment of pulmonary tuberculosis; that results are better at high altitudes than elsewhere and become better with every thousand feet of elevation gained up to six or seven thousand feet. It has been sought to demonstrate statements such as these by comparative studies of sanatorium reports at high altitudes and at sea level. The objections to this method are numerous; suffice it to say that the indefiniteness of our schemes of classification, the personal equation which unfortunately is so great a factor in the survey of cases of pulmonary tuberculosis and the many conditions aside from climate which influence the course of the disease make such studies practically worthless in proving or disproving the value of high climates.

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*Read before the Harlem Medical Association, March 1, 1922.

We have the opinion of trustworthy authorities that tuberculosis is harmfully influenced by high elevations. Pottenger (2) states that the great majority of the tuberculous, especially after they have advanced beyond the initial stage, are at a disadvantage at high altitudes, and Fishberg (1) says that high altitudes are no panacea for tuberculosis.

Within recent years scientific evidence has been advanced to show that the value of high altitude in tuberculosis is due to its beneficial effects upon the cardiovascular, respiratory, and hematopoietic systems. If we sift the scientific data in support of the alleged therapeutic value of high altitudes we find that all is unproved hypothesis and conjecture from a clinical standpoint. Although we know a great deal of the compensatory physiological effects of high altitude on these systems in the healthy individual, it still remains to be proved that they are of benefit to the tuberculous and why. We do know, however, that the effect of deepening and acceleration of respiration due to lessened atmospheric pressure and the decreased quantity of oxygen may be extremely disadvantageous and distinctly harmful in a considerable proportion of cases by the increased amount of work thrown on the lungs and the heart.

On the other hand, it is no longer necessary to defend the statement that pulmonary tuberculosis can be successfully treated in any climate and that good results are not dependent upon altitude or even ideal climatic conditions, but upon skilled medical supervision and the influence of adequate physical and mental rest, a suitable diet, and above all sufficient means and time for treatment. Given these there is no doubt that excellent results are obtained in the health resorts of the western climates in suitable cases.

It should not be necessary to call attention to the futility of sending hopelessly far advanced cases with severe complications to high and distant climates in the expectation that they will be benefited. Yet the large number of such cases who go there by advice of practitioners is justification for emphasizing what should be selfevident. In general it may be said that the following types of cases are not suitable for, and as a rule do badly at, high altitudes, everything else being equal, and that the great majority of them are distinctly better off and have, bad as it may be, a better prognosis at low altitudes:

1. All unilateral and bilateral advanced, active, progressive cases with destructive processes and cavitation.
2. Extensive disease even of a chronic nature, especially with fibrosis associated with dyspnea, cyanosis, and marked emphysema.
3. Cases complicated by ulcerative laryngitis, definite intestinal and peritoneal tuberculosis, or persistent diarrhea.
4. Cases with the following nontuberculous complications irrespective of the stage of the pulmonary disease: cardiac disease, nephritis, albuminuria, arteriosclerosis, diabetes, bronchitis, and neurasthenia.
5. Cases, even without extensive disease of the lungs, with continued fever or with a pulse of 120 or more under absolute rest, especially if it is of impaired quality, and those with a tendency to profuse hemorrhages.
6. Cases even in the early stages of the disease of the asthenic type with markedly enfeebled vitality and digestion.

Patients in the initial stages of the disease without serious organic complications and functional disturbances are frequently benefited by change to a high climate after they have failed to respond to treatment under favorable conditions in the home climate. As a general rule, however, the prognosis in these cases is probably just as good in a low climate. Mere change of environment is frequently followed by marked improvement.

In any case strict individualization is of the greatest importance. The duration and extent of the lesion, whether it is active and progressive, certain symptoms and complications, the probable degree of favorable reaction and adaptibility to the change based upon a knowledge of the particular climate, and the possible injurious effects of absence from family and friends must be carefully considered. We must get away from the apparently prevailing idea that a positive sputum is the only indication for treatment in a high and distant climate.

It should be remembered that even under favorable conditions the period of acclimatization at a high altitude is often a crucial one. Apparently favorable lesions of moderate extent may become more active and progressive because of the inability of the weakened organism to meet the demands of the intensive reactions produced by the altitude.

It is also important to consider the possibility of reactivation of the disease after return to the home climate. My impression has been that after prolonged residence at a high altitude, patients, particularly if they are more or less advanced, do badly on return to a low altitude. Patients who do well should therefore be advised to remain in the high altitude. In general it is preferable to seek to effect a cure in the climate in which the patient intends to remain. It has also been my impression that relapses after an arrest has been achieved are not any less frequent at high than at low altitudes.

Above all, the economic status of the patient must be taken into account. Few consumptives of the working class can afford the expense of proper treatment for a sufficient length of time in a distant place. There is absolutely no excuse for advising far advanced indigent consumptives, and most of those we ordinarily have to deal with may be classed as indigent, to go to distant regions in search of that extremely doubtful and mostly hopeless thing—a cure of the disease. It has been my experience in Colorado that a large number of indigent, advanced consumptives come there under the impression that mere residence in this reputed Mecca will enable them to pursue their former or some other occupation or that they will be able to do it after a short term of sanatorium treatment. These mistaken ideas are very frequently engendered and encouraged by the practitioners. The consequences of such advice are extremely deplorable.

CONCLUSIONS.

In conclusion let me crystallize my remarks by stating:

1. There is no specific climate for the treatment of pulmonary tuberculosis; that no one climate is suitable for all cases of the disease and that it is becoming more and more the consensus of trustworthy opinion that tuberculosis can be successfully treated anywhere under a proper régime of rest, fresh air, diet and time.
2. There is no conclusive evidence to lead us to believe that high altitude is of any specific influence in the disease.
3. On the contrary, the great majority of the tuberculous and particularly those in the advanced stages are harmfully influenced by altitudes above from one thousand to two thousand feet.
4. Indigent consumptives, especially those in the advanced stages of the disease, should not be sent to high and distant climates.
5. It is important that these facts become of more common knowledge among physicians and the laity.

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1215 MADISON AVENUE.

X Ray Study of Tuberculous Lungs

By THOMPSON FRAZER, M.D.,

and JOHN D. MAC RAE, M. D.,

Asheville, N. C.,

Consulting Radiologist, U. S. P. H. S. Hospitals 60, for Tuberculosis, Oteen, N. C., and 45, Kenilworth, Biltmore, N. C.

Although the employment of the x rays in the diagnosis of chest affections has been a recognized procedure for many years the significance which should be attached to x ray findings seems to be unappreciated by the profession as a whole.

The questions that are frequently asked are:

1. What is the value of the x rays in the diagnosis of tuberculosis?
2. Is it necessary that they be employed in order to establish a diagnosis?
3. If not, why should the patient be put to the additional expense which their use entails?
4. Do the x rays supply any information that cannot be obtained by other methods of examination?
5. Are the findings in accord with the results obtained by physical examination of the chest?
6. If not, to which should the greater importance be attached?
7. Will the x rays supersede the older methods of examination?

It seems to us that rather definite answers can be given to all of the above questions:

1. The employment of the x rays is a procedure of inestimable value in the recognition of tuberculosis.

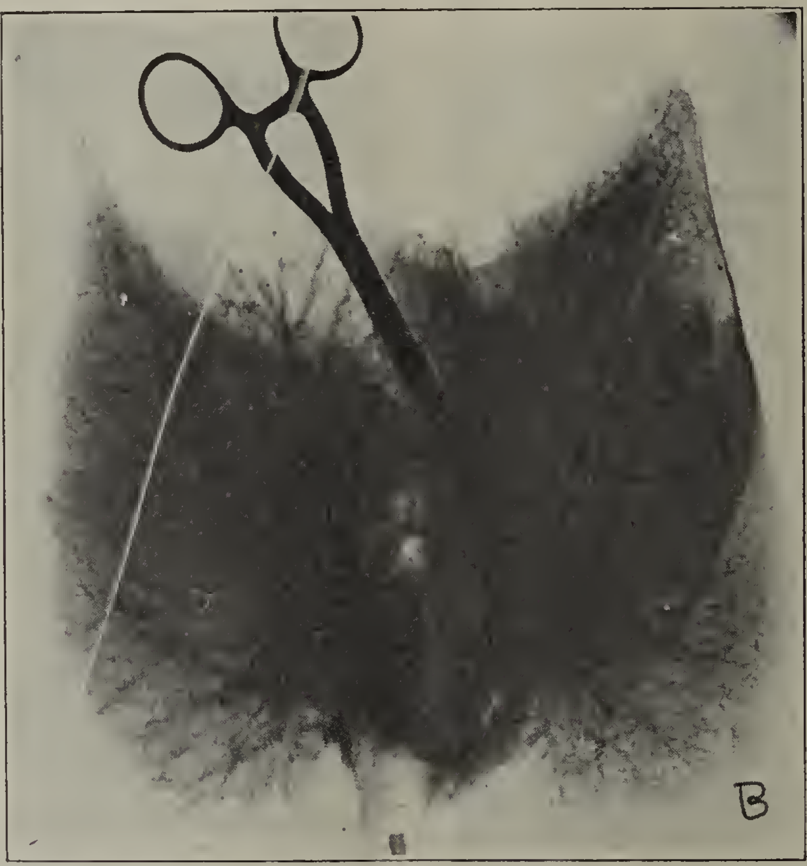

FIG. 1.—Lungs, postmortem, inflated, showing trunks. Posterior view.

2. In many cases, perhaps in most cases, the use of the older methods, history taking, physical examination, and examination of the sputum may suffice to establish a diagnosis. These methods, most available and most important, should never be neglected.
3. The additional expense involved in making stereoscopic plates is fully justified in that one obtains a more complete clinical picture of the individual case. Secondly, because we are furnished with a permanent graphic record which may be compared with subsequent plates.
4. X ray plates frequently disclose conditions which are not discoverable by other means.
5. The findings as revealed by the physical examination of the chest and by the x ray plates are frequently not in strict accordance; not uncommonly the röntgenoscopic examination reveals more evidence of pathology than would have been suspected from the physical examination alone.
6. The information supplied by x ray plates should be looked upon simply as so much additional evidence which must be properly evaluated. Under no condition should the symptoms or the results of

the physical examination be disregarded, nor a final from the physical examination alone.

7. The x rays, therefore, will not supplant the well recognized methods of examination. The röntgenologist, however, should go his full length in describing the lesion. He should make a diagnosis and express a prognosis from x ray findings alone, his opinion being unaffected by any knowledge of the physical findings. A correct value must be placed on the changes in the plates; the overlooking of the slighter changes and the reading of too much into the plates being the chief dangers to be avoided. There should then be a conference between clinician and röntgenologist, after which such changes may be made in the conclusions as may be indicated by the joint findings.

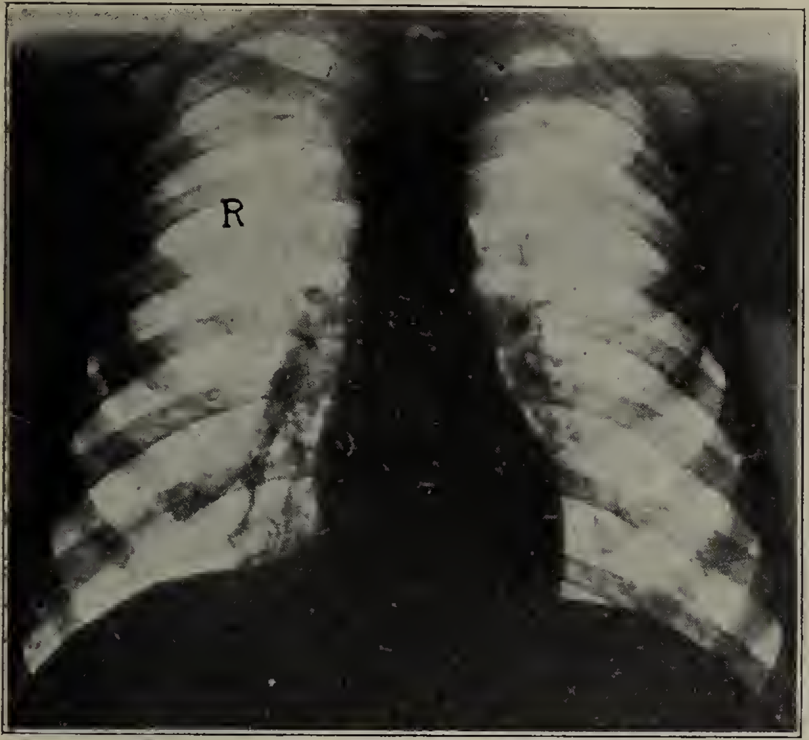

Fig. 2.—Normal chest. Symmetrical, phrenic angles clear, hilum shadows average size and density, lung fields clear.

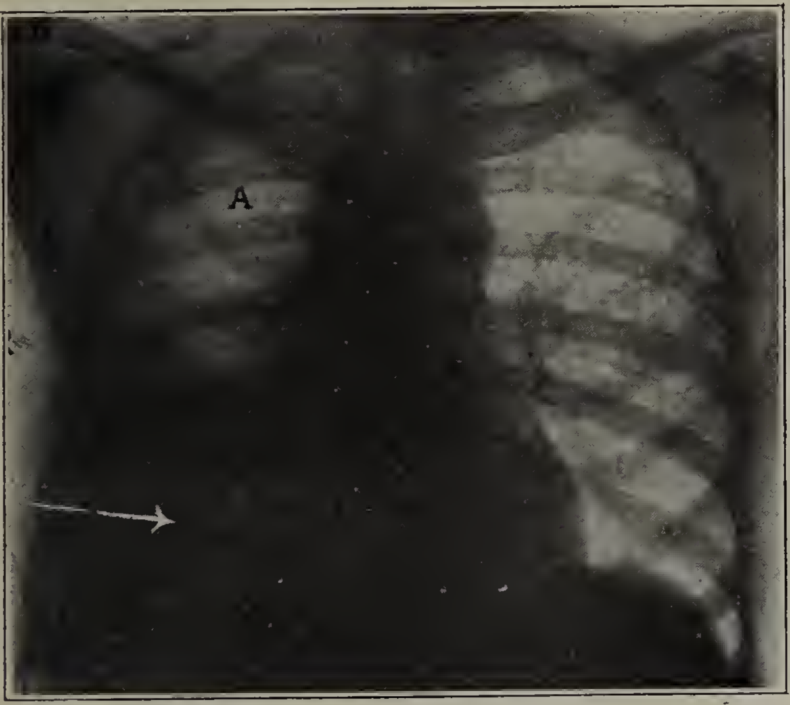

Fig. 3.—A, rib spaces narrow. B, thick pleura, effusion.

INTERPRETATION OF THE NORMAL CHEST.

Correct interpretation presupposes a knowledge of the normal chest (Fig. 1), and while the markings vary greatly in different chests there are some descriptive points which may be applied to all. The normal chest is symmetrical, with the trachea in the midline, and the heart and mediastinal organs occupying the centre of the chest; on each side of the mediastinum are the hilum or root shadows of the lungs, and radiating from the hili are the trunks which become less conspicuous until the terminal branches at the periphery are almost invisible. In x ray terminology the word trunk is often used. It means the shadow radiating from the root of the lung which is cast by a bronchus, its accompanying vein, artery, lymph masses and lymph channels with connective tissue binding them together. The peripheral branches are important in that it is there that we look for the early lesions.

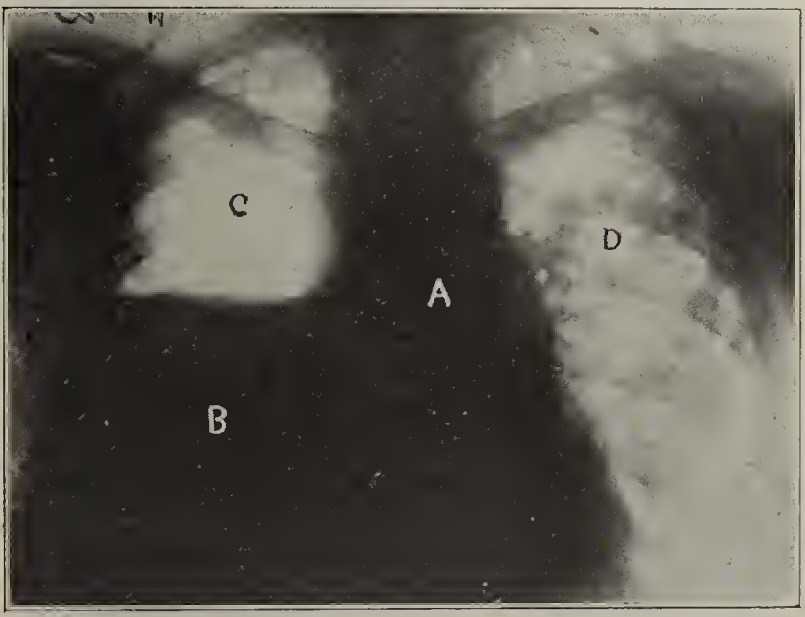

Fig. 4.—Hydropneumothorax. A, mediastinum pushed to left by fluid in right chest. B, fluid. C, air. D, infiltration, activity.

The right diaphragm is in front of the ninth rib and the left is slightly lower. The phrenic angles are clearly made out and should be fairly acute; the domes arch upward on each side. The lung field on each side of the mediastinum should be clear except for the hila and trunk shadows; shadows about the hila are of little importance unless they are very pronounced. Trunk shadows should be clear cut.

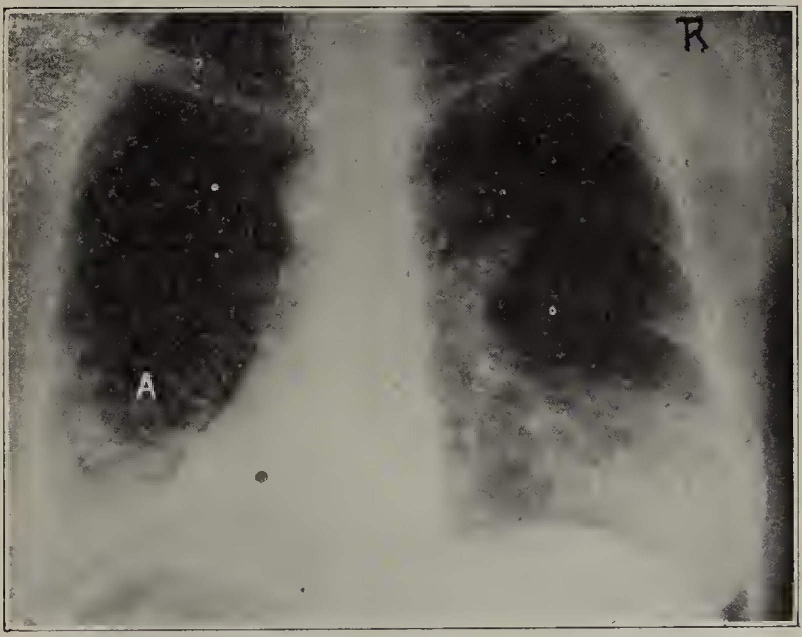

Fig. 6—A, cavity, nontuberculous.

Trunk shadows to the lower lobes are somewhat heavier and thicker than those to the upper lobes.

PATHOLOGICAL CHANGES.

The changes in the adult chest will be dealt with as follows: 1. Bony framework; 2, mediastinum; 3, the muscles and soft tissues; 4, the pleura, and 5, the lungs.

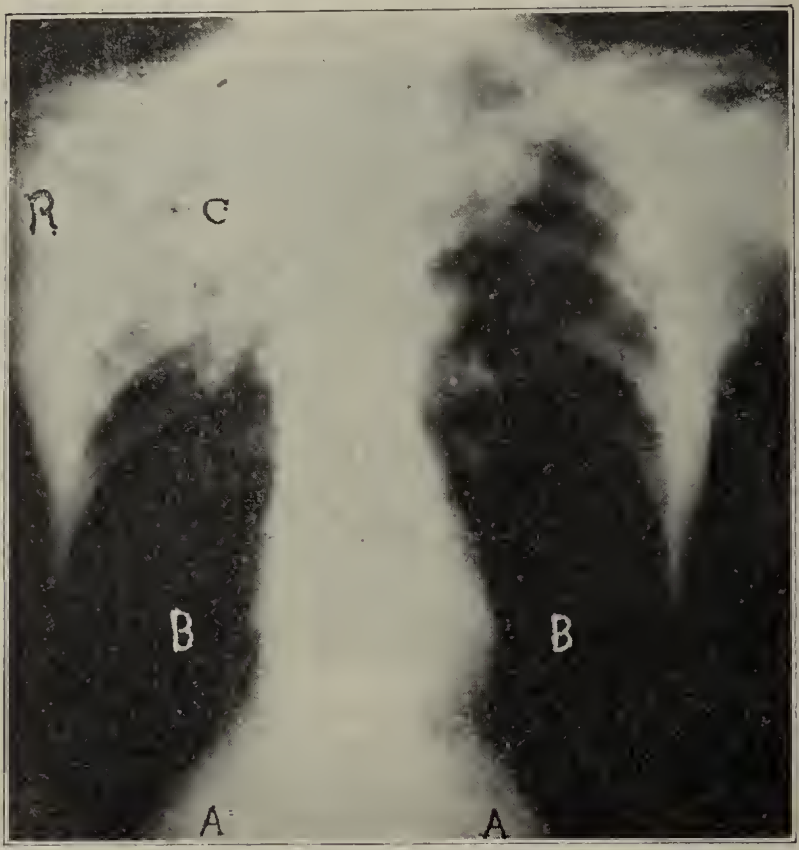

Fig. 7.—A, flattened diaphragm. B, emphysema. C, dense fibrosis.

1. Narrowing of rib spaces means flattening of the chest. This asymmetry may result from an acute pleuritis or from very chronic fibrous disease contracting the lung tissues and limiting expansion in respiration, or from markedly destructive lesions.

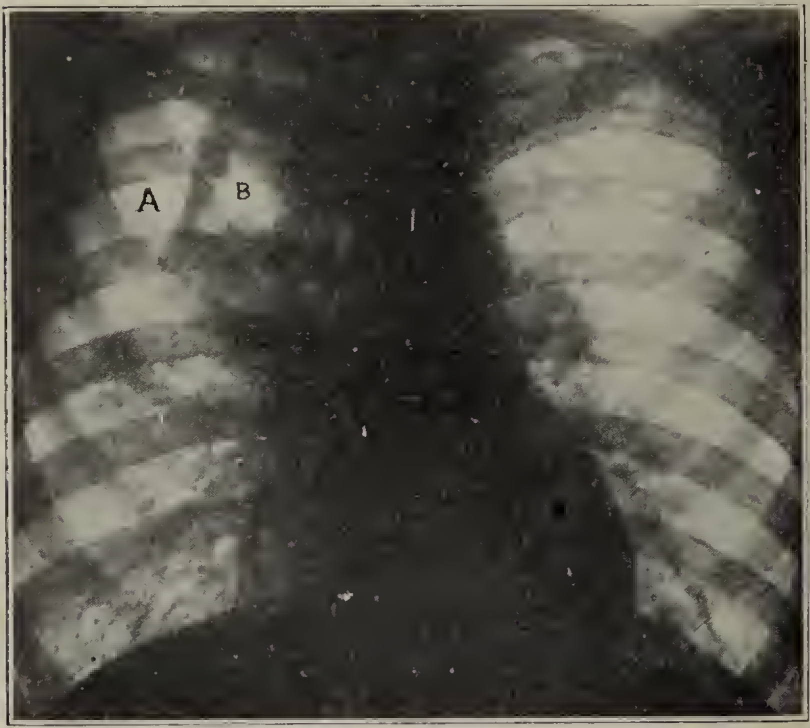

Fig. 10.—A, pneumothorax, artificial. B, cavity.

2. If the mediastinum is displaced to one side or the other it may be so as the result of fluid accumulating, or by reason of changes which produce contraction or destructive processes which impair the power of the lung to expand.

3. The diaphragm may be depressed by emphysema or drawn up by adhesions (Fig. 7). The mammæ in women may be so developed that they obscure changes in the bases of the lungs. Contrary to what is commonly expected, if the shadows of the pectoral muscles are prominent in the x ray plates we expect to find an emaciated patient rather than one who is of good muscular development.

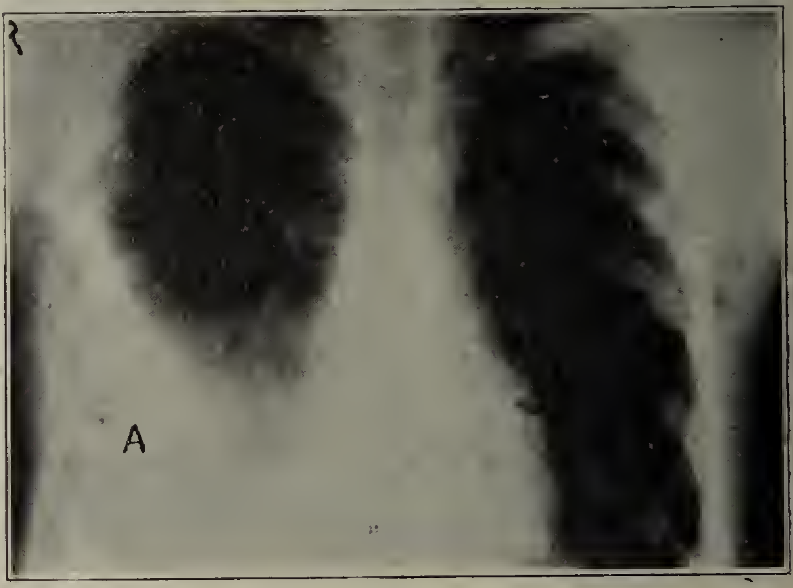

Fig. 11.—A, encapsulated fluid.

4. Pleural thickening is of every degree; fluid or air may be present in the pleural cavities. Effusion into the pleural cavity is common; it may be free or encapsulated (Fig. 11). Free fluid does not change its level quickly with change of position, but does so strikingly when air or gas exists in the pleural cavity with the fluid. Encapsulated fluid of course does not change its level. Thick pleura overlying fluid will cause it to be very difficult to say when the fluid has disappeared, either by aspiration or by absorption (Fig. 3).

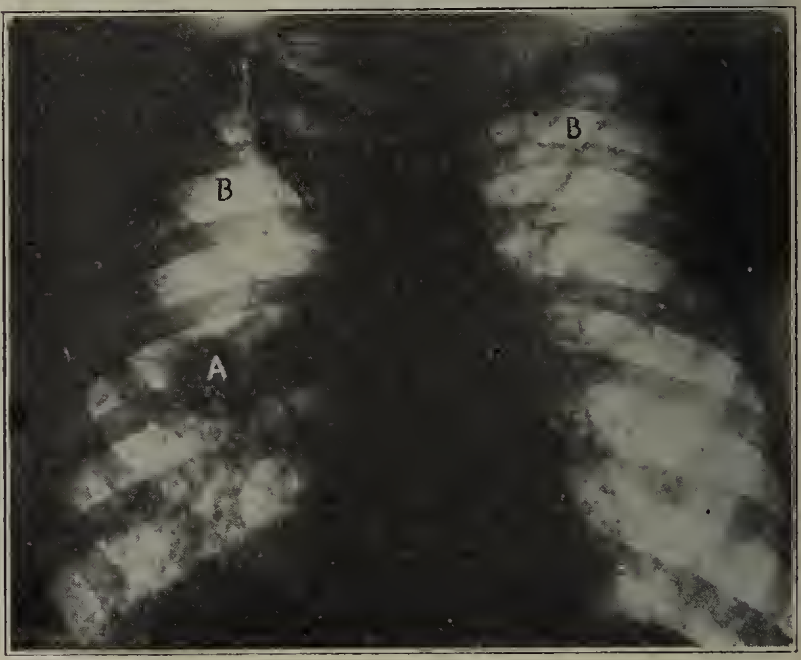

Fig. 12.—A, caseation. B, striated shadows, fibrosis.

Pneumothorax is either artificial or spontaneous. It is recognized in the plates when no lung markings are seen and the margins of compressed lung are made out. Unless adhesions between parietal and visceral pleura prevent, the air and gas in the pleural cavity will collect at the place overlying that seat of disease in the lung itself, especially if cavity exists (Barlow). Hydropneumothorax is a combination of the two above conditions (Fig. 4). The points above brought out direct our attention to the lung fields for a search of underlying pulmonary conditions, for as we have indicated, these changes are the secondary results which follow in the wake of pulmonary disease.

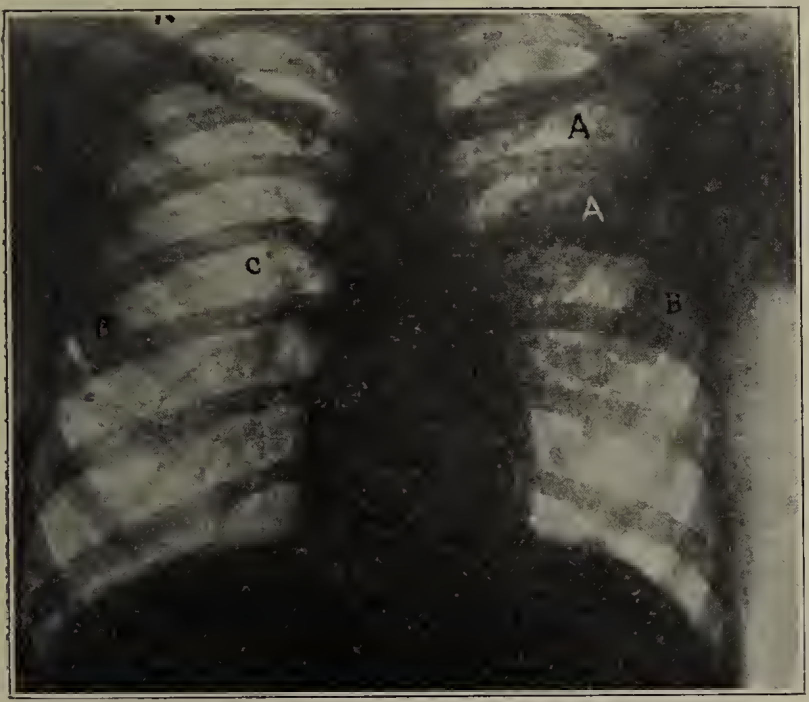

FIG. 13.—A, fibrosis and infiltration. B, Pectoral muscles. C, calcified lymph node.

5. A radiograph records the varying densities of the object depicted. A tuberculous lung undergoes certain changes which produce variable densities and by the character of these densities it may be determined whether infiltration, fibrosis, caseation or calcification exists.

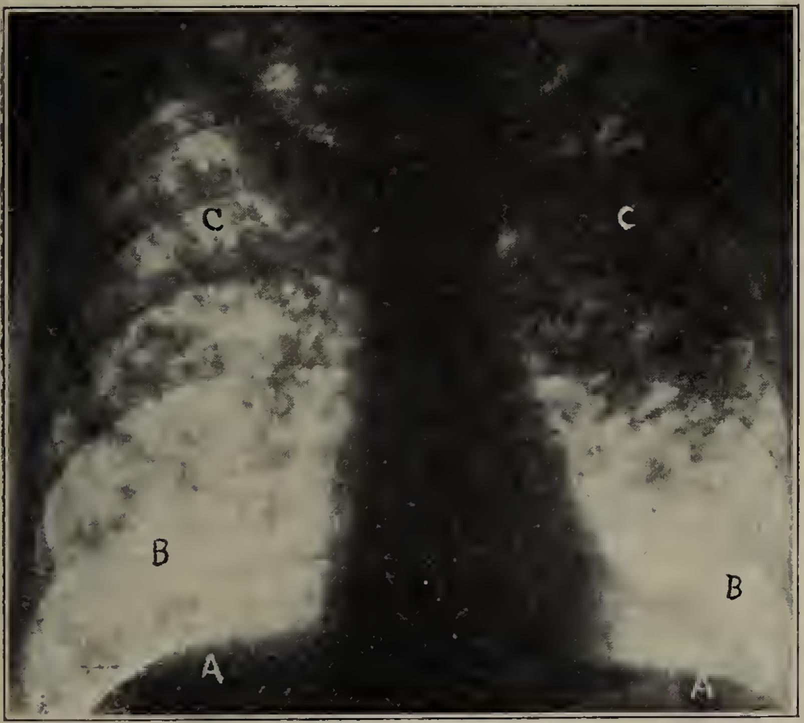

FIG. 16.—A, diaphragm flattened. B, emphysema. C, caseous bronchopneumonia.

Calcification is represented by shadows which are dense and clear in outline. The position in which calcification is common is at the root of the lung where the hilus nodes which have been the seat of tuberculous infection have undergone the process of being arrested by calcification. In the lungs of healthy persons it is rare to find one without calcified nodes about the hilum. These represent the early tuberculous infections which most of us have had and which give us the relative immunity which we possess.

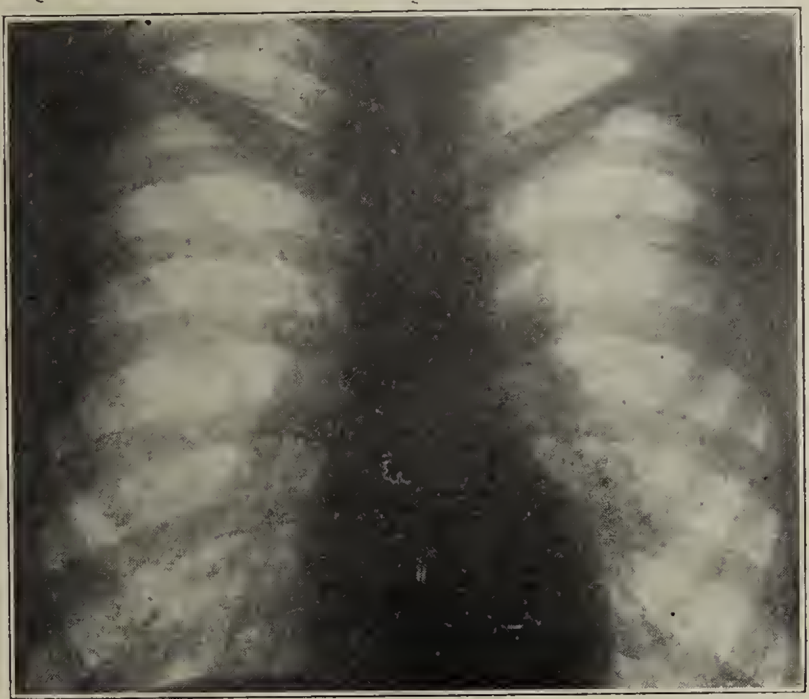

FIG. 17.—A, pneumokoniosis.

Caseation is the process which precedes calcification, if calcification is to occur, or which precedes cavitation if the patient's disease is going to progress. It represents masses of conglomerate tubercles which are not quite so dense as those of calcification and the distribution of caseation is different; more commonly it is distributed well outward from the hila into the parenchyma (Fig. 12). Caseation commonly takes place in small masses, hence the x ray picture of caseating bronchopneumonia is one showing many dense points widely scattered, or it

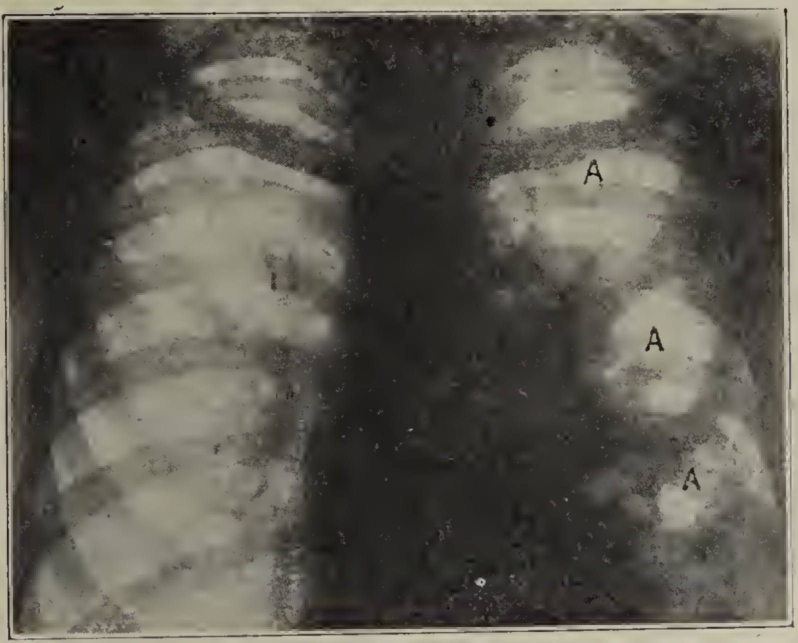

FIG. 19.—A, multiple cavities.

may be collected into groups. Sometimes a whole lobe may be of uniform density with caseation (Fig. 16), or a few small caseating points only may be seen within the lobe.

When conglomerate tubercles caseate and then break down by liquefaction, necrotic material is expelled from the centre of the mass and a cavity is formed. Cavities at first do not have well defined walls but if the patient develops good resistance, firm well defined walls form.

Cavities are commonly seen among the terminal branches of the trunks of the upper lobes (Fig. 10). They rarely occur near the hila before destruction has become extensive (Fig. 19). A cavity may contain fluid and air. When this is so the fluid level will change as the patient's position is changed, just as it does in hydropneumothorax. Cavities are not necessarily tuberculous in origin (Fig. 6).

Fibrosis may produce dense shadows but it is laid down in a characteristic way. When fibrosis takes place it represents the scars left by the healing of tuberculous processes which have not advanced to a state of caseation. In the main, fibrosis is found among terminal branches of a trunk where active infiltrative processes had been arrested (Fig. 13). The shadows representing fibrosis are generally laid down in lines and are described as linear markings.

Infiltration: When a lesion is still active but undergoing fibrosis there will be cast shadows which are streaky, and others which are more or less flocculent; the flocculence represents parenchymal lesions where larger or smaller masses of air cells are filled with debris—mucus, epithelial cells—which is the condition found in early tuberculosis.

Activity: We think that from the changes described it is possible to discuss with a certain degree of intelligence the question of activity, for the shadows of a distinctly healed tuberculosis are different from the shadows cast by an active process. In the former the shadows are clear cut and striated, in the latter, soft hazy and flocculent in character and having illdefined outlines.

Emphysema is a condition of low density which should be discussed here. It is generally compensatory. In the presence of chronic fibroid phthisis and also in some other conditions, air cells dilate, stretch and lose their power to return to their original size. If emphysema is general the thorax will bulge in all its diameters; before this extreme condition is reached, the diaphragm is depressed and flattened. The acuteness of the costophrenic angles is lost as the domes of the diaphragm are pushed downward, and the x rays penetrate such lungs with greater ease. The radiograph of such a condition is characteristic (Fig. 7).

NOT ALL SHADOWS TUBERCULOUS

Now there are many conditions which may produce shadows other than tuberculosis, and peribronchial tuberculosis is a term which should be discarded, for the bronchi become thickened and cast fuzzy shadows following any of the diseases of childhood, pertussis, measles, scarlet fever, etc., as well as from pneumokoniosis (Fig. 17), and chronic lung affections. If peribronchial tuberculosis exists it is usually secondary to more pronounced lesions elsewhere in the chest.

It is characteristic of tuberculosis that its lesions are located in one or both upper lobes and that the different lesions are of different age and different densities. When uniformly thickened trunks are recognized it is unlike tuberculosis and we think of it as being secondary to influenza or some other lung condition.

That condition known as brown induration, which results from pulmonary stasis secondary to cardiac disease, casts a shadow similar to that of influenza. We have seen lungs the seat of actinimycosis which were strikingly like tuberculous lesions; the differential diagnosis being made by the clinical history as well as by the examination of the pathological specimen.

Specific disease of the lungs has, in our experience (MacRae), accompanied tuberculosis oftener than it has existed alone, as numerous postmortem examinations have shown, and in spite of much that we have read we do not feel that differentiation between the two processes can be made readily.

SUMMARY.

We believe that a röntgenographic study of lungs is so valuable that no examination should be regarded as complete without this procedure.

A Pulmonary Sign in Acute Infections of the Biliary Tract.—D. P. D. Wilkie (*British Medical Journal,* June 10, 1922) calls attention to the pulmonary symptoms and signs sometimes accompanying primary and focal lesions in the upper abdomen. Crepitations may be heard at the right base of the lung in quite a number of cases of acute biliary infection, and also with infection of the bile ducts and where the gallbladder is not the chief seat of the trouble. There are three theories as to the etiology of this finding: 1, a spread of the infection from the gallbladder or bile ducts by way of the peritoneum through the lymphatics of the diaphragm to the pleura and the base of the lung; 2, that reflexly, from irritation of the sensory fibres of the phrenic nerve, the diaphragmatic excursions are diminished on the right side, resulting in diminished expansion of the right lung and hypostatic congestion of that lung, and 3, that the lung condition is a blood infection settling in a part of the lung in which the expansion is restricted by the factors mentioned above. In twenty-three acute surgical cases of biliary infection, this basal congestion was found present in twelve and absent in eleven; in two cases pleural friction was also present. In no case did any pneumonic complication follow the operation, and in one case pleurisy with effusion was found on the following day. The mortality was nil. Ether anesthesia was used in twenty-four cases and chloroform in seven. The author concludes that in a patient with pain in the right costal margin and round the right side of the chest, the crepitations or pleural friction at the right base does not preclude but supports the diagnosis of acute biliary infection and that these signs are not contraindications for operation, but on the contrary they will be relieved by surgical removal of the primary focus of disease.

The Present Status of Radiation Treatment of the Tonsils

By CARL F. ROBINSON, M.D.,
Barre, Vermont.

The resourceful physician, finding that his usual method of treating a condition is closed to him, tries to improvize a way of doing the same thing in another manner. Thus Witherbee (1), in his search for a method of treating diseased tonsils in patients exhibiting heart disease, hemophilia or some other condition contraindicating operation, experimented with the x ray and found that many cases responded—an atrophy of the tonsil taking place and an absorption of the immature lymphatic cells in the follicle which lessening the depth and resulting in a distortion of the crypt caused at the same time an eversion and an evacuation of the crypt contents.

My work along his lines produced results similar to his, but early in 1921 I was led to experiment with radium because it seemed to me that a direct application of the rays would eliminate the possibility of any injury to overlying structures. I also desired to apply the softer rays directly to the tonsil, which is impossible with external application of the x ray —the softer rays being filtered out to avoid skin reaction.

A series of 156 cases can now be reported. In 145 cases, six weeks after the radium application, a small atrophied tonsil only was seen and only by pushing back the anterior pillar. Symptoms of neuritis and rheumatism were reported as disappearing about two weeks after treatment. Five cases were unsatisfactory—the tonsil being fibrous and radiation therefore unsuitable. However, the tonsil showed a smoothed out appearance and in one case hearing was improved materially. Eight cases are in course of treatment.

My technic is simple, consisting of the introduction of two 12.5 mg. radium needle directly into the centre of the tonsil under local anesthesia. The entire throat is swabbed over with a two per cent. novocaine solution—a procedure which is necessary in order to prevent gagging. The needles are left in place from two to three hours.

Recent literature contains several references to the radiation of tonsils and it is interesting to follow the different methods. Each worker trying in his fashion to cause an atrophy of the tonsil and thus benefiting humanity.

Simpson (2) applies radium directly to the tonsil using a thirty mg. flat applicator of double strength. This is held directly against the tonsil by means of a long instrument for an hour. He is quoted: "With this original technic it is perfectly remarkable how quickly the tonsils begin to shrink and show other atrophic changes. A mild reaction which turns the tissue white is to be seen where the radium is held. This slight irritation of the tonsil disappears in two to three days. In one patient with a temperature of 101°, exudate in the crypts of the enlarged protruding and inflamed tonsils, cervical glands of the neck the size of half an orange, associated with malaise and loss of appetite, the picture was changed in one week and after a single treatment. The enlarged glands disappeared in three weeks, and only a part of the tonsil was to be seen when the anterior pillar was pulled to one side." Simpson used x ray treatment externally at the same time that the radium was used.

Radium needles are introduced directly into the tonsillar tissue by Wells (3). Quoting from his article, "For the purpose of comparison it has been my habit to begin always with the larger tonsil and the effect is impressive when at the next setting we observe that the proportion has been reversed and that the previously larger tonsil has now become the smaller one. In addition to the mere reduction in size, a difference is remarked in the appearance of the organ. A tonsil that previously presented an irregular nodulated surface, or perhaps has been of the socalled ragged or spongy type, now appears smooth, firm and pale. Very important proof that atrophic process has successfully attacked the diseased lymphoid structure is found in the progressive lessening of colonies of bacteria and especially in the fact that we can no longer obtain pathologic exudate from the crypts on pressure. The author has histological proof of the effect of radiation in bringing about cellular atrophy. I have had sectioned and examined microscopically tonsils that have been radiated and then removed surgically at varying intervals of time afterwards. With sufficient dosage it is certain that we can obtain an atrophy of the tonsil which may liken to the normal physiological atrophy and that all physical evidences of disease are made to disappear."

Williams (4) reports cases treated by direct application of the radium applicator with results similar to those quoted above by Simpson. Delavan (5) writes that "very small amounts of x ray were sufficient for the reduction of the lymphoid tonsil, doses so small that no injury resulted to other parts from its application. J. H. Murphy, Craig, Hussey and Sturm (6) have published interesting reports favorable to x ray treatment. Hickey reports that the throats of diphtheria carriers can be sterilized with suitable x ray treatment.

There is a feeling among many physicians that, because the region of the neck contains so many important anatomical structures, radiation treatment may do harm. This feeling is not shared by radiologists because of their daily use of much heavier doses used in treating malignant conditions of the throat and neck. Boggs writes: "Literature fails to reveal the report of any case of untoward effects of radiation on the thyroid, parathyroid, pituitary or parotid gland."

One thousand milligram hours of radium is an ordinary dose given for metastatic glands in the neck and an x ray dose of 5 Ma., sparkgap nine inches, filter 3 mm. aluminum, with a distance of ten inches for six to seven minutes is regularly given if radium is not at hand. Thus a much smaller dose given in treating the diseased tonsil surely cannot do harm to adjacent tissues. Bergonie and Tribondeau's law is that "immature cells and cells in an active state of division are more sensitive to radiation than are cells which have already acquired their fixed adult morphological or physiological characters." If we accept the above law or the teachings of Dominici that elementary cells are receptive or sensitive to hard rays and the wellknown selective action of radium then fear of radiation treatment of tonsils must be laid aside.

Turning from the safety of this treatment to the effect of radiation upon bacteria we find that Murphy (7) reports forty-six patients with tonsils both hypertrophied and otherwise pathologically altered and some of whom had in addition adenoid masses and lymphoid deposits posterior to the pillars of the fauces which were given treatment. In all but four cases the treatment was followed by marked atrophy by opening up and drainage of the tonsillar crypts. As this process progressed, the previously enlarged tonsils assumed a smooth and normal appearance and hemolytic bacteria—streptococci, and staphylococci chiefly—which were often present in the affected tonsil, disappeared usually within four weeks of treatment.

Probably the bactericidal action of radiation is derived from the secondary beta rays and the alpha rays—chiefly from the beta rays which are produced in the tissues during the passage of the gamma and x rays. McKee says that these rays are able to interfere markedly with cultures even to the point of complete destruction. However, this subject has few references of carefully controlled experiments and presents a fertile field for much discussion.

I have seen a neuritis of long standing clear up in four weeks after radium treatment of a diseased tonsil. I have also seen cases of acute and chronic rheumatism become free of this disease after atrophy of the tonsil by radiation. At present we (8) are introducing a solution of iron into areas to be treated by radiation with the hope of increasing the production of secondary beta rays. We have noticed that an acutely infected tonsil reacts much better than the chronic, possibly because of the presence of more blood with its iron content in the tonsil, the iron increasing secondary beta radiation.

Radium seems to us to be the method of choice because only one application is usually needed. It may be augmented with an x ray treatment externally. Ewing says that "Radium can be relied upon to do the same thing under the same circumstances." The x ray is not quite as reliable but, with the advent of the Collidge tube, technic may be carried through with a smaller chance of error than formerly. Children are afraid of the noise of the x ray but I find that they rather enjoy the external radium treatment because of the novelty of having their head bandaged up.

The manner of application of radium differs with different men but the object is always the same and results similar. I still think that the introduction of the radium needle directly into the tonsil with supplementary x ray treatment to the neck is the method of choice because it affords an ideal application of the agent.

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A Case of Ludwig's Angina

By DAVID H. LEVY, M.D.,

New York.

Because of the rarity of this condition, the novelty of the treatment employed and the exceptional result obtained, I feel justified in publishing this single case.

CASE.—G. P. E., aged thirty-three, retired on the evening of May 19, 1922, feeling perfectly well. He awoke on the morning of May 20th feeling quite ill. There was soreness and pain in the floor of the mouth and great difficulty in deglutition, and pain when he attempted to open his mouth or to swallow. This condition grew steadily worse.

I saw the patient for the first time on the evening of May 21st, and examination showed that he was unable to open his mouth more than one quarter of an inch and attempting to swallow caused severe pain. His temperature was 103° and pulse 120. Direct examination showed a hard induration in the submaxillary region, under the inferior maxilla, more marked under the point of the chin. He could not protrude his tongue. A provisional diagnosis of Ludwig's angina was made. On the following morning (May 22nd), the patient was much worse, all signs having increased in severity. The entire floor of the mouth was swollen, hard and indurated; the tongue was congested and so swollen that only the tip could be protruded between the teeth; the temperature and pulse were the same. A marked point of tenderness was present under the tongue in the floor of the mouth on the right side. The patient looked septic. I had him removed to a private sanitarium, and considered my provisional diagnosis confirmed.

Because of the results obtained in various infectious conditions by the intravenous use of neutral achriflavine-pro injectione in the wards of the City Hospital, I decided to give this drug a trial and to postpone surgical interference, at least for a few hours longer. At 4 p. m. twenty c. c. of a one per cent. solution was injected intravenously.

I returned to the sanitarium at 12 p. m. planning to interfere surgically if the condition had progressed any further. But, as the patient stated he was much more comfortable and the pain had markedly decreased, and since the temperature had fallen to 101°, I decided to postpone any surgical interference for the time being.

The next morning (May 23rd) the patient was markedly improved; the temperature was 100°, and all signs were receding. The patient was given another twenty c. c. of a one per cent. solution and he continued to improve rapidly throughout the day and following night.

The next morning (May 24th) he was able to open his mouth widely, the swelling of the tongue had practically disappeared; he was able to protrude the tongue much more freely and without pain. He stated that he was perfectly well. I decided to give him a third injection to complete a cure. At this time the temperature was normal. The patient was kept in the hospital until the 28th under observation, and was then discharged completely well.

In view of the brilliant result obtained, it would appear that this drug should be given a trial by the profession in a wide variety of infectious conditions so that its field of usefulness as well as its limitations may be established.

156 West Seventy-seventh Street.

Peritonsillar Abscess of Unusual Location*

By ADOLPH I. SCHWARTZ, M.D.
New York.
Chief of Clinic and Surgeon Ear, Nose and Throat, Stuyvesant Polyclinic; Visiting Otorhinolaryngologist, People's Hospital.

Peritonsillar abscesses are of common occurrence. They are frequently met with and diagnosed by the general practitioners without any difficulty. Following an acute tonsillitis where the symptoms at the end of a few days instead of being ameliorated, become more severe, there is almost always a suspicion of an abscess forming in the throat.

Often the diagnosis is made before the patient is examined by the characteristically full, thick, muffled guttural voice; the inability of the patient to open the mouth (fixation of the lower jaw in itself is symptomatic and almost pathognomonic of the affection); by excessive painful deglutition; by the general appearance of the patient who is showing great weakness; by pain radiating in the ear of the affected side with attempts of swallowing, and other symptoms. On examination, which is accomplished in many cases with great difficulty owing to the fixation of the lower jaw and gagging, one can see the anterior pillar of the fauces and the soft palate of the affected side to be intensely red, swollen, often edematous, projecting far more forward than those of the opposite side provided this is not involved.

These characteristic symptoms are produced and easily accounted for from the very location of the abscesses. It is out of the province of this paper to go into detail of these peritonsillar abscesses of common occurrences—that is, those pointing toward the upper pole of the tonsil.

We will limit ourselves to the cases that follow, where some of these symptoms have been lacking and where the diagnosis has not been made for many weeks following an acute tonsillitis. Although the literature of acute peritonsillar abscess is quite voluminous, it may be interesting to state that in making a careful search of textbooks and medical periodicals which appeared in the past twenty-four years, no case similar to the ones to be reported has been described.

It was assumed that the most careful tonsil work has been done during this period. If one's experience counts for anything, I have never before seen a case of this type in seventeen years of practice either in the clinics or in private practice.

REPORT OF CASES.

Case I.—Mrs. R. K., aged forty-two, was seen in consultation on January 30, 1922. The following history has been related by the attending physician. The patient was taken ill with acute tonsillitis four weeks ago. Fever and inflammation of the tonsils subsided after a few days, but the pain on swallowing became greater every day on the right side, and at the time when the patient was seen it was so intense that she could not partake of any food, fluid or otherwise. There was snoring and choking at night and general symptoms of distress. The patient answered questions with a peculiar muffled, guttural voice. The mouth could be opened pretty freely. On examination the throat looked normal, no signs of an inflammatory nature could be noticed in the tonsillar region on either side. Therefore, the diagnosis of abscess has been dismissed by the physician in the case. There were only two symptoms: The voice of the patient and the excessive pain in deglutition which were suggesting the presence of pus somewhere in the throat.

It was noted that when the tongue was pressed down to inspect the lower pole of the right tonsil, great pain was elicited, and the patient will jerk away or push me brusquely aside. The index finger was introduced and a very painful spot, at the lower pole of the tonsil between it and the base of the tongue was palpated. There was no pulsation present. Fluctuation could be decidedly ascertained at the next introduction of the finger. Pressure was abruptly made into the fluctuating mass, which was hidden by the popping up of the tongue, and a fair quantity of foul smelling pus followed. The patient felt relieved and after a few minutes could swallow water while I was present. I have not seen the patient since but was informed subsequently that she had a quiet night following the evacuation of pus; began to eat and gradually had fully recovered in a few days. Incidentally it may be said that this was the first case in my experience. I have never before met with a throat abscess at this site.

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*Read at the Clinical Meeting of People's Hospital, October 11, 1922.

Case II.—Mr. M. M., fifty-six years old, clothing packer. was brought to my office on March 28, 1922, by Dr. L. Friedman. The man was pale, emaciated, had lost considerable weight. The physician gave the following history: Illness began with an acute tonsillitis about two months previously. The acute condition in the throat subsided but the pain was so intense in the last two weeks that the man was prevented from eating. A swelling on the right side of the neck, below the angle of the lower jaw, painful to palpation, was noticeable. An x ray taken March 25, 1922, visualized moderate induration of the tissues on a line parallel with the third and fourth cervical vertebræ on the right side and a shadow which suggested a possible localized pus pocket. The peculiar voice mentioned before was present as soon as the patient began to talk but he could open his mouth well and on inspection nothing abnormal could be noticed, neither on the soft palate nor on the anterior pillars. Pressing the tongue down great pain was experienced and the examination had to be interrupted for a great while. The index finger introduced at the base of the tongue between it and the right tonsil, a fluctuating mass was felt. There was no pulsation. The diagnosis of abscess was made, a free incision performed and pus followed the knife. A drain was inserted and after a few days of drainage the man made an uneventful recovery. The swelling of the neck gradually subsided. At the end of six days it disappeared and the patient was discharged. It is to be regretted that the circumstances were such that no examination of pus could be made.

CONCLUSIONS.

The following practical conclusions can be deducted:

1. Peritonsillar abscesses pointing down the inferior pole of the tonsil are extremely rare.
2. Only two symptoms: Intense pain on swallowing and the characteristic guttural voice persisting for weeks, suffice to lead us on the track for diagnosing the abscess at this location.
3. When the patient lacks the pathognomonic symptom of fixation of the lower jaw, can open his mouth freely and the upper part of the tonsil and adjoining soft palate look negative on inspection, don't discard the diagnosis of peritonsillar abscess.
4. Always examine the lower pole of the tonsils by pressing the tongue down and in towards the median line with a tongue depressor.
5. When pain is elicited by this manipulation and a mass is present, always palpate the mass with your finger.
6. Make sure there is no pulsation, for fear of meeting with an angioma or any other vascular tumor.
7. Ascertain fluctuation.
8. When the latter is present incise and drain and the results will be most satisfactory to both patient and physician.

236 Fifth Street.

Diagnosis of Optic Neuritis Due to Sinus Disease

By JOHN N. HOFFMAN, M.D.,

Canton, Ohio

To definitely decide that visual defects are due to disease in the nasal sinuses should be the result of considerable careful investigation. If a thorough routine examination was always consistently carried out the number of cases diagnosed as such would be considerably less. In addition fever patients would be subjected to nasal sinus surgery.

According to Fuchs the various causes of intraocular optic neuritis are as follows: Brain diseases, as tumor, abscess, multiple sclerosis, acute and chronic meningitis; lues; acute infectious diseases; disturbances of nutrition; acute anaemia from loss of blood; lead poisoning; heredity; and inflammations or tumors in the orbit or developing upon the nerve.

Lead, alcohol, tobacco and other toxic agents cause a retrobulbar neuritis. To these may be added toxic absorption from various sources in the body including the teeth, tonsils, bowels, and nasal sinuses. In dealing with the effect of diseased nasal sinuses we find we have the posterior ethmoid and sphenoid sinuses which are so located anatomically that there is direct connection between them and the optic nerve. We shall assume that we are dealing with a patient whose eye condition is due to disease in the posterior group of nasal sinuses and the necessary steps in the differential diagnosis will be outlined.

In taking the history one should get all the information possible as to the beginning and duration of the visual trouble (which may be monocular or binocular) if the present is the first attack or whether others have preceded it, and its association, if any, with other disorders of the patient's health. In the cases studied by the writer where the diagnosis seemed clear-cut almost all were monocular. His occupation, surroundings and habits should be asked about to aid in discovering the absorption of any toxins. The visual acuity should be recorded and the usual ophthalmic examination made. The opthalmoscope may reveal no lesions or the changes may range from a slight pallor of the nerve head to those of a marked neuroretinitis. The majority of patients studied have had no changes in the fundi—if seen early. In a few patients it was thought that the temporal side of the disc may be somewhat paler than normal. Negative ophthalmoscopic findings are very frequently the result.

Perimetry should always be employed, if visual acuity allows, because the visual field changes are characteristic in disease of the posterior sinuses, involving the optic nerve. The visual fields, in patients where the posterior sinuses are diseased, depend largely upon the amount of involvement of the nerve. Careful examinations of the early cases will often show an enlargement of the blind spot and a central scotoma for colors; the two are soon connected in more advanced cases unless the progress of the inflammation is stopped. As the disease progresses the scotoma becomes absolute. The form fields are often irregularly contracted and are not of value in a diagnosis. The taking of fields upon numerous occasions is strongly advised and the condition of the fields affords an efficient method of judging the progress of an inflammation of this sort after treatment or operation. If visual acuity is markedly lowered rough tests will give an approximate idea of marked defects in the fields. Laboratory tests, with especial stress upon lues, should be carried out as speedily as possible. The other tests upon the body fluids should always be made. A complete physical examination should follow and a neurological examination should determine the condition of the central nervous system with especial reference to the brain. Granted that the foregoing tests are negative we still have a difficult field in examining the nasal sinuses.

Clinical examination and x ray will usually easily determine the presence of purulent conditions. These offer but little difficulty in diagnosis. In estimating the presence or absence of nonpurulent conditions, which are hyperplastic, we should make several careful examinations. The relation between the nasal septum, the middle turbinates and the lateral nasal walls should first be considered. The condition of the nasal mucosa is often of value; a boggy hypertrophic condition indicates some chronic disturbance. Hypertrophy of the inferior turbinate also often indicates nonpurulent sinus disease. The nose has no pus but more than the usual amount of mucous may be present. Granular pharyngitis is often associated with this type of sinus disease. Bimanual palpation of the floor of the mouth may reveal the presence of enlarged and tender lymph glands which are often an indication of nasal sinus infection. The luetic origin of this type of nasal change must always be kept in mind. A diagnosis of hyperplastic sphenoiditis and ethmoiditis should not be made upon one finding but upon a combination findings and after several examinations of the nose. Applications of cocaine and adrenalin to the region around the middle turbinate occasionally causes some change in vision temporarily which is helpful in reaching a diagnosis. The impaction of a middle turbinate tightly against the lateral wall is especially stressed. The X ray may be of considerable help in nonpurulent sinus disease but careful technic is an essential and the findings cannot always be relied upon.

In the differential diagnosis the history, if carefully taken, will usually exclude toxic amblyopias. Perimetry in this condition generally shows bilateral pericentral scotomata and the blind spot may or may not be included. A typical condition according to Peter is the presence of an absolute scotoma in a large relative area. In optic nerve atrophy the visual fields have a variety of changes but the color fields are always much more contracted than the form fields. Scotomata may or may not be present. Space will not be devoted to an analysis of the fields found in the different types of optic nerve atrophy as this would entail considerable description. Hysteria is marked by concentric contraction of the form fields and reversal of the color fields. In the different conditions with which choked disc is associated the perimeter will show varying findings. Some of these, in early cases, will closely simulate the visual fields found in posterior sinus disease, and are referred to in order that the extreme care needed in diagnosis may be illustrated. Perimetric findings, while invaluable, are not an absolute means of diagnosis and must be combined with the other examinations.

At times, patients will be encountered who present some general condition as lues plus the clinical signs of posterior sinus involvement and the perimetric findings of an associated neuritis. I feel that one's judgment is severely taxed in these cases in order to correctly decide to what cause the visual impairment is due. In doubtful cases I feel that treatment or operation on the sinuses should be done because vision might be retained which otherwise would be lost.

When the patient has been thoroughly examined as suggested and pathological changes as detailed are discovered only in the nose I feel that one is justified in urging prompt treatment or operative procedures upon the posterior sinuses. The objection has been raised that a complete examination occupies too much valuable time but the examination, as outlined, with the exception of a few of the laboratory tests, can be completed in a fairly brief interval. Useless temporizing is not urged but an accurate effort should be made to find the cause of the condition. The following points are to be especially emphasized:

1. Optic neuritis, indistinguishable by the ophthalmoscope, has a variety of causes among which are infections in both the anterior and posterior nasal sinuses.
2. Visual field findings are the only characteristic of neuritis due to diseased posterior sinuses and are of the same type in purulent and nonpurulent infections.
3. The occurrence of neuritis due to diseased nasal sinuses is relatively small if all proper means are used in making a diagnosis.
4. Great caution must be exercised in making a diagnosis of hyperplastic sinusitis and thorough examinations should exclude other pathology before deciding that the sinuses are the cause of the neuritis.
5. Reports of visual improvement following sinus operations should not be considered conclusive until some months after the operation; vision is frequently temporarily better for a time due to the local blood loss even though some other cause than sinus disease is present.

1001 New Harter Bank Building.

Editorial Articles

EIGHTY YEARS OLD.

This is the Eightieth Anniversary of the founding of the *Medical News*, one of the four great medical journals which have been consolidated into the New York Medical Journal and Medical Record. The four are the *New York Medical Journal*, the *Philadelphia Medical Journal*, the *Medical News*, and the *Medical Record*.

Many changes have occurred during these eight decades of medical journalism. A great deal of valuable material has been published which has been of inestimable service to the medical profession. Out of the flux has come the present fusion which has brought strength and experience. From growth and centralization the New York Medical Journal and Medical Record has been evolved. We realize our responsibility and are ever striving to better this journal in order to improve its standard and make it more useful.

EVOLUTIONAL LEVELS IN THE NERVOUS SYSTEM

Sir Frederick Mott, writing in a recent number of the *Lancet* on Body and Mind: the Origin of Dualism, includes an interesting and illuminating discussion of the doctrine of Hughlings Jackson's levels. Mott says: "We may consider that there are three evolutional levels in the nervous system, and this hypothesis is supported by comparative anatomy and the effects of functional and organic disease of the nervous system. The lowest level is present in all animals and subserves the primal instincts of selfpreservation and preservation of the species. It consists of two parts: 1, the vegetative nervous system, consisting of two systems, a, the involuntary autonomic or parasympathetic, and, b, the sympathetic, with which are associated the ductless glands, and which controls and directs the bodily needs and functions concerned with gratification of the appetites and desires connected with the instincts of selfpreservation and propagation; 2, the protopathic sensorimotor nervous system, which controls the reflex activities for protection against pain and injury, including injurious degrees of heat and cold.

"The second level is the discriminative sensorimotor level. In the vertebrate series, we find two great groups: 1, macrocosmatic, in which the nervous structures that are especially developed are those connected with smell and taste; and, 2, microcosmatic, in which the senses of sight, hearing and touch are especially developed. The archicortex of the cerebral hemispheres is highly developed in the former, the neocortex in the latter. The projection centers of these senses are around the primary fissures.

"The third highest level is the psychic level, in which there is a great development of the cortex of the brain, and which in man far exceeds in development that of the largest anthropoid apes. *Pari passu* with this great development of the cerebral hemispheres, is a bodily development far surpassing in excellence all the lower animals: viz., erect posture—by which the forelimbs are no longer used for progression—and perfection of the hand, whereby it becomes, not only the instrument, but the instructor of the mind, for, guided by vision, it is enabled to create and make the most of varied mental adjustments to environment and control the forces of nature. By the creation of graphic and articulate language, which have simultaneously progressed, has been built up a great social heritage constituting an endowment to civilized man, whose organ of mind is, however, no larger nor heavier, and possibly potentially no better than that of the men who dwelt in caves 50,000 years ago, whose only common mode of expression was, it may be conjectured, mainly by vocal sounds, gestures, and facial expression, a primitive, universal, emotional language, understood by all peoples.

"Now, in idiots who are incapable of articulate expression and abstract thought, we find only the two lower levels properly represented; the development of the anatomical basis of psychic level—i.e., the millions of cells in the cortex—is arrested in development and we have a condition, then, of amentia or absence of mind. If we examined sections of the cortex, we should find the supragranular layer of pyramids especially affected. This layer, as Bolton has shown, is developed later than the infragranular layer. Moreover, I have shown that, as you rise in the zoological scale of vertebrates, it is this layer that increases in depth and number of cells. Simple dementia or loss of mind may be associated with a limited destruction of the anatomical basis of mind—viz., the highest psychic level—and, the two lower levels being more or less intact, the habitual acquired sensorimotor reactions may remain and the individual then may behave as an automaton in response to environmental influences and bodily needs. Every part of the body is represented in all the three evolutional levels, and, as Hughlings Jackson taught, the last to come evolutionally is the first to go. The three physiological levels are functionally interdependent. The highest level, upon which awareness and volition depend, is able to act through the second discriminative sensorimotor level to alterations in the streams of sensation from the external world; while the third and lowest level evolutionally is concerned with the involuntary vital functions of the body, and therefore constitutes the basic source of the desires and impulses connected with self preservation and propagation."

INOCULATIONS FOR SMALLPOX.

In a time when the word smallpox is heard more frequently and when the efforts of a large number of persons, including the socalled educated—even socalled educators—in some of our cities recently visited by the ominous sickness, are put forth to prevent its prevention, a little history of past experience with this disease and efforts toward its control are especially interesting.

For there is, no matter in what department of life, nothing so illuminating and useful as history. Would that it were taught in our schools, not the names of the Kings of England nor of the Presidents of the United States nor of the Wars of the Roses nor of the Rebellion, but of more intimate matters in human affairs. A little chapter on inoculation for the smallpox would stand for an example.

The introduction of this practice quite upset the intellectual centre of our country—Boston, lining up the clergy, the schoolmasters, physicians—everybody. The Mathers, Cotton and Increase, led the fight for inoculation—in fact, it seems probable that it was through the efforts of these two witch fearing worthies that the process was introduced into the country, for they first received word of it, and then encouraged the bold Dr. Boylston to begin his work.

The word inoculation, in connection with smallpox, will doubtless be interpreted by many a reader as meaning vaccination, for most of us doctors have had our schooling in history sadly neglected. We must confess that it was not until fifteen years after medical school days that we learned the meaning of this term.

Inoculation for smallpox was supposed to have begun in China, but at any rate it came into use in Europe about 1713. Boston was always in the lead in good things, and it was in 1721 that Boylston began his work. Inoculation consisted in nothing more or less (and the less needs emphasis) than the introduction, not of cowpox material into the uninitiated, but the transmission of the real thing—matter from a smallpox pustule to a person who, presumably, had never known the disease. True, hit or miss efforts were made to minimize the danger, by passing the material from person to person—arm to arm, as it was called—by diluting the contagious matter with water and by choosing virus in a crude or unripe stage.

Boylston had no such suggestions (of doubtful use) to guide him, for the Boston physician who received a communication from the Royal Society telling of the methods employed abroad, joined the ranks of the antiinoculators and refused to allow others to see the English report. Boylston continued his labors, despite the professional and lay war that waged so violently that Cotton Mather said he "never saw the Devil so *let loose* upon any occasion. A lying spirit was gone forth at such a rate that there was no believing any thing we heard." Boylston was himself "put to a great fright by the clamor or rather the rage of the people." The clamor and rage originated, not as does presentday agitation against vaccination, but from objection to man's attempted interference with the workings of Divine Providence. In thirty years Boylston had inoculated 1752 persons. In about the same period Kirkpatrick of Charleston, S. C., had done some eight hundred.

The significant thing in all this is that anyone should dare to inoculate and, even more, that anyone should wish to be inoculated, for, as someone has put it, there seemed to be but one advantage, namely, that one could have the disease at his own convenience, and at a time when there were enough not sick of the plague to take care of him. Still, it may be that the disease was less deadly when introduced through the skin than when contracted in the ordinary way, for Boylston had only thirty deaths from his inoculations, and Kirkpatrick had but eight.

The outstanding feature to be read between the lines is that smallpox was such an omnipresent and frightful affair and so uncertain a risk that one might as well have it in as safe a way and at as convenient a time as possible and have it over with. So reasoned Ben Franklin when his child died of the disease, that he might better have had him inoculated and run that risk rather than run the risk of contracting the disease otherwise.

Inoculation added to Jenner's brilliant work with the cowpox vaccine, for, to test the efficacy of this protection, he inoculated some of those he had previously vaccinated, and—behold—there was no result—the protection by vaccine was assured.

INTRACAPSULAR OPERATION FOR CATARACT

The wide divergence of opinion concerning the merits and demerits of the intracapsular method of extracting cataract devised by Lt. Col. Smith, of the Indian Medical Service, has found expression so often that we have really grown tired of the subject. Perhaps this because its merits have been dwelt upon so strongly by those who have studied with and come under the strong and winning personality of Col. Smith, while the demerits have been pointed out by those whose experience with the operation has been comparatively slight. However, this may be, it is a pleasure to read a paper by an intracapsular operator who uses the method in ninety-five per cent. of his cases and yet appreciates that it is subject to closer limitations than those which have been presented by its distinguished and genial originator.

Dr. H. T. Holland contributes to the *Indian Medical Gazette* for August a paper on Some Contraindications to the Intracapsular Operation for Cataract Based on Eight Thousand Cases. Eight thousand cases may be a small number according to Indian standards, but it is greater than many American surgeons can accumulate in a lieftime and one sufficient to furnish an observant surgeon definite conclusions. He states frankly that he is an advocate of the operation, that he believes it would have fewer opponents if its advocates would admit its limitations, and that he has learned by sad experience the kinds of cataract upon which it should not be performed.

The only classes of cataract considered by Smith unsuitable for intracapsular extraction are 1, congenital; 2, juvenile up to thirty years of age, and secondary or after cataract. Holland adds to these several other classes. He considers that the operation should not be performed on a full blooded, fat, plethoric individual with large, prominent so-called ox eye as he has found a decided tendency to escape of vitreous in such cases. Then come cases which appear normal, but resist legitimate pressure to rupture the zonule. He has difficulty in defining the legitimate amount of pressure and says that experience alone can enable the operator to decide when he has reached the limit, but he is convinced that when it is very difficult to rupture the zonule and the lens does not present at the corneal incision as it should, it is better to reinsert the speculum and perform capsulotomy than to court disaster in the shape of a large escape of vitreous material.

His third class of cases would seem to be a part of the second, as it includes cases of double cataract in comparatively young persons with dark hair, in whom the zonule often proves very resistant. In these cases if pressure is persisted in too long the zonule breaks as it were with a snap and out comes the lens followed by vitreous. His fourth class is composed of cases in which glaucoma is present either as a complication or a cause, cataract in glaucoma or glaucomatous cataract. In the former he agrees with Smith as to the advisability of a large iridectomy, but differs from him as to intracapsular extraction three months or so later. He includes among these cases those in which the tension is slightly elevated, and prefers extraction with capsulotomy as affording less danger of choroidal hemorrhage. Glaucomatous cataract is seldom fit for operation at all, but in the few cases in which it is advisable he prefers capsulotomy. Finally he prefers capsulotomy in traumatic cataract, because of the decided tendency of vitreous to escape when the intracapsular operation is performed.

It is evident that Holland considers loss of vitreous a much more serious complication than does Col. Smith, an opinion in which he will have the support of most, if not all, American surgeons. His suggestion that "it is more than possible certain operators may have been unsuccessful in some of their intracapsular work from ignorance of these contraindications" sounds rather more than plausible.

HIGH BLOOD PRESSURE AND ITS TREATMENT

It is notorious that high blood pressure is extremely prevalent nowadays, at any rate, if it is not very much more common than formerly, a great deal more is heard of the condition than ever before. It may be, and probably is the case, that everything to do with the circulation is done more exactly than formerly and that consequently more cases are diagnosed.

But it seems fairly certain that there is a greater number of cases proportionately of high blood pressure than there was, say, thirty years ago. It is said by some that hypertension is made a bogey of now, and that it is not nearly so dangerous as it is stated to be by many heart specialists. This may be true to a certain extent, and the danger of the condition may be exaggerated; at the same time there is no evading the fact that it is sufficiently dangerous to give rise to alarm on the part of the sufferer. It is a danger signal warning to go slow. Hyptertension is a condition intensified by modern cultivation.

Modern methods of living, while it must be allowed that the human system is wonderfully adaptable, tend to affect the circulation. However, the argument propounded here is not that high blood pressure is greatly due to the wear and tear of modern existence involving an immense strain on the nervous system and affecting the heart prejudicially, but that it is largely owing to intestinal toxemia, a sequel to disorders of the gastrointestinal tract and to intestinal stasis in particular.

Dr. N. Mutch of London contributed an article to this journal February 15, last, in which the thesis was set forth that alimentary toxemia arising from chronic intestinal stasis, is a frequent cause, perhaps the most frequent cause of heart affections and of high blood pressure. So far as high blood pressure is concerned, Mutch holds that there is no doubt that toxins of some nature are found in the intestines and when absorbed cause a serious rise in the blood pressure. Sir James Mackenzie advises that in the treatment of affections of the heart, it is advisable to overlook symptoms, heart affections are usually symptoms, find out the primary cause and treat it.

Mackenzie believes that a goodly proportion of heart complaints have their origin in toxemia. Dr. R. McNair Wilson is of the same opinion and indeed heart affections are generally classed as toxic and infective. Moreover, the origin of the toxic form is, in the opinion of many authorities, in the gastrointestinal tract. Alimentary toxemia will cause high blood pressure, or is a potent factor in its causation. These cases may be recognized by the excessive amount of putrefactive products in the urine.

Again many authorities assert that an excess of uric acid in the system is the main cause of high blood pressure; some go further and assert that it is the sole cause; and as excess of uric acid is chiefly brought by alimentary toxemia it is obvious that the rational treatment is to try to put the gastrointestinal tract into good working order as well as the urinary tract and the kidneys which are both involved in the toxemia. Diet, hygiene of the bowels, intestinal disinfection and so on will go a long way, but at the same time, the urinary tract should be disinfected and free elimination from the kidneys established.

The retention in the body of large amounts of uric acid in the system must be abolished, and with this end in view, not only must the gastrointestinal tract be thoroughly cleansed, but as said before the urinary tract must be rid of its excess of uric acid and putrefactive products and the kidneys encouraged and urged to eliminate freely—such a course of treatment is following Sir James Mackenzie's advice to treat underlying causes if it is granted that gastrointestinal disorders are underlying causes of high blood pressure.

CALCIUM IN METABOLISM

A sufficient supply of the mineral salts in the body is essential to proper metabolism and to health. Absence of mineral salts means death and a supply insufficient to control the metabolic equilibrium means ill health. Of the mineral salts the calcium salts are the most important and lack of these upsets the metabolic balance. The vast importance of a sufficiency of calcium in the human economy is now beginning to be thoroughly understood. In many diseases and conditions of ill health the amount of calcium in the system is insufficient for the purpose of proper metabolism, while certain diseases are mainly due to a want of calcium even though this may not be the primary or underlying cause. Rickets are brought on undoubtedly by a deficiency of calcium, whatever the cause of this deficiency may be, want of sunlight, unhealthy environment, inadequate or unsuitable and so on. Tuberculosis again, at any rate, in some forms, is largely owing to the decalcification of the system. It must be borne in mind too that the parathyroid glands have a very intimate relationship with calcium metabolism. The consensus of medical scientific opinion now is that the action of the parathyroids is antagonistic to that of the thyroid and that they play a special part in the fixation of calcium in the tissues. If therefore the parathyroids are not working in a normal manner, the nervous system, owing to the deficiency of calcium, will become irritable and tetany may follow.

Dr. Hurst in the special number on endocrinology of this journal gave an example of a case of extreme nervousness cured by the oral administration of dried extract of parathyroid oxgland. In the *Lancet*, November 4 last, Dr. I. C. Graves sums up the value of the administration of calcium. With regard to chronic sepsis, it would appear that calcium plays a part in the reexcitation of the activities of the mobile defences of the body in conditions of chronic sepsis, and, after the removal of the cause of the chronic sepsis by the induced reaction, calcium dries up the exudates. When a chronic toxemia is present Grove and Pines found that the tonic calcium of the blood becomes deficient. Improved peripheral circulation is a characteristic response to treatment by calcium and this improvement may similarly obtain in the alimentary tract leading to improved digestive processes. When calcium is administered the diminution of night sweats is evident, a result associated with a lessening of chronic septic absorption. Reference has been already made to the fact that the withdrawal of calcium from the body leads to an increased irritability of the sympathetic nervous system and Graves states that the administration of calcium does away with the hyperirritability.

Lastly, it is pointed out that nutritional gain is a feature of cases showing calcium deficiency, treated by the administration of calcium. Moreover, while diet will to some extent remedy a calcium deficiency in the system, and while, of course, a diet rich in lime salts is indicated in such cases, diet alone is not curative. Not only then must the diet be rectified but when decalcification is obvious, calcium must be administered. Rickets and tuberculosis are the diseases in which decalcification most manifests itself but in convalescence from nearly all the acute infections decalcification is present. Also in many of the chronic diseases an inadequate amount of the lime salts is a distinctive symptom. In fact decalcification exists in all diseases and conditions in which nutrition is at a low ebb and in which there is deterioration of the nervous system, for the simple and sufficient reason that a lack of calcium means that metabolism is at fault, consequently food is not being digested and assimilated as it should be, the body is not nourished properly and the want of calcium injuriously affects the nervous system. It cannot be too strongly insisted that calcium in adequate quantities is essential to normal metabolism.

NEUROLOGY.

The *Paris Médical* for October 7, 1922, is devoted to neurological material. The material has been carefully assembled and it is a number which should be in great demand. The following is a list of the authors and subjects appearing in this special issue: Jean Camus, *La Neurologie en 1922 (Revue annuelle)*; Barré, *Les sympathalgies de la périphérie des membres;* Foix et Nicolesco, *Valeur diagnostique et prónostique, modifications du tonus au cours des paraplégies d'origine médullaire;* André Thomas, *A propos du tonus musculaire, l'extensibilité et le réflexe antagoniste;* Roshem, *De l'art de choisir ses rêves;* Barbillon, *Agonie et anesthésie;* G. Pranzo, *De l'empirisme et des superstitions en médecine chez les Arabes de la Tunisie;* Mousson-Lanauze, *La médecine dans Aullu-Gelle;* Jean Camus, *L'impöt progressif sur la natalité;* Peytel, *Escroquerie et accident du travail;* Rabier, *L'honnête hommer.*

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Obituary.

DR. ALBERT HENRY BUCK,

of New York.

At the regular meeting of the New York Otological Society, held November 28, 1922, the following obituary of the society's first president, Dr. Albert Henry Buck, was ordered to be incorporated in the minutes and also to be submitted to the medical journals for publication: There are comparatively few, perhaps, who read this brief sketch, who will recall a courteous, kindly gentleman, whose smile was reassuring and whose countenance instilled a confidence in the strength and the will to give aid to one in need; a scrupulously honest, lovable man—one of the grand old men of medicine—Dr. Albert H. Buck, who has just passed on.

He was born in New York City October 20, 1842, the son of Dr. Gurdon Buck, one of America's noted surgeons. Switzerland, his mother's native country and where he received a part of his early education, remained throughout his life the Mecca to which all roads led whenever it was feasible for him to travel. He was an Alumnus of Yale College, class of '64; of the College of Physicians and Surgeons, class of '67, and of the New York Hospital.

After his internship in New York Hospital he went abroad and in Germany and Austria, under Politzer and others, devoted his entire time to the study of the ear and its diseases. After his return to New York his indefatigable labors resulted in the early recognition of his ability and skill. He was made an aural surgeon in the New York Eye and Ear Infirmary in 1872, and, after half a century, death severed his connection with the institution as a consulting aural surgeon. For a number of years he was consulting aurist to the Presbyterian Hospital; lecturer and later professor of otology in the College of Physicians and Surgeons, medical department of Columbia University. He was fourth president of the American Otological Society, being preceded in office by Dr. Henry D. Noyes, Dr. D. B. St. John Roosa, and Dr. Clarence J. Blake, and was the first president of the New York Otological Society.

Dr. Buck's literary tastes and linguistic knowledge were employed in the editing of the voluminous and epochmaking medical works of the American edition of *Ziemssen's Cyclopedia of the Practice of Medicine,* eight volumes, first edition, 1887; second edition, 1890; the *American Practice of Surgery,* eight volumes, 1908; also the American translation of Stricker's *Manual of Histology,* one volume, 1872; and *Hygiene and Public Health,* two volumes, 1879. These were apart from his many contributions on otological problems in the medical journals. His work on *Diseases of the Ear* was peculiarly the individual result of his own observation and study. The third and last edition was published in 1898.

After retiring from the practice of otology his virile mind demanded occupation and so, after much research in the libraries of this country and those of abroad, Dr. Buck gave to the world in 1917 a most entertaining and instructive book, *The Growth of Medicine from the Earliest Times to About 1800.* It was the first book published by the Yale University Press on the Williams Memorial Publication Fund, and in 1920, in the seventy-eighth year of his life, he completed his labors with *The Dawn of Modern Medicine,* also published under the auspices of the Williams Memorial Publication Fund, by the Yale Press.

His modesty and reticence were so marked that to the many he was unknown, but fortunate were those who could claim the friendship of this true and lovable man. Many, many will be benefitted because he lived and worked as befitted a man of science.

Robert Lewis, M. D., F. A. C. S.,
Edward B. Dench, M. D., F. A. C. S.,
Committee.

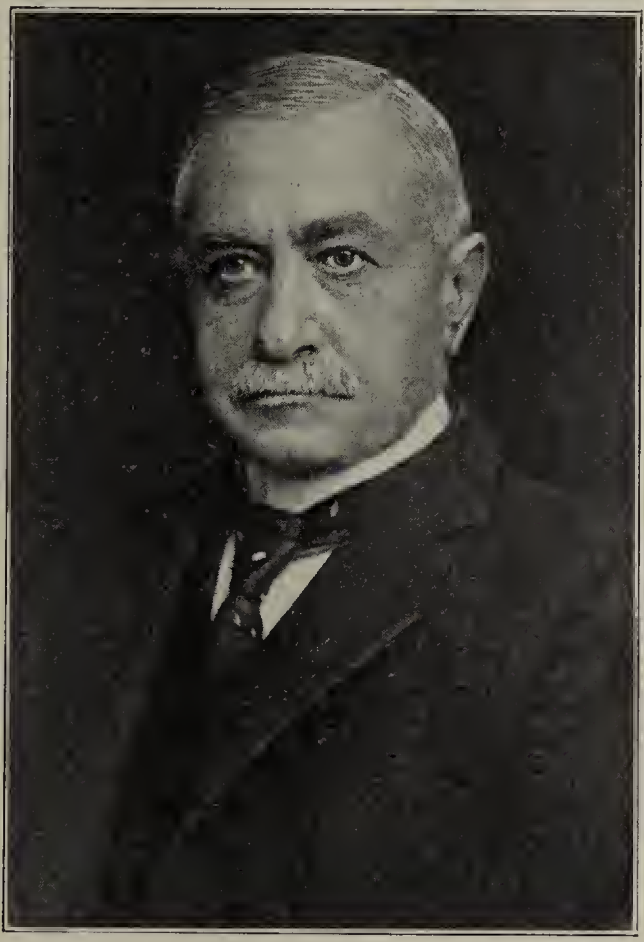
JOSEPH EDCIL WINTERS, M. D.,

of New York.

The recent death of Dr. Joseph E. Winters, Prof. Emeritus of Diseases of Children, Cornell University Medical College in the City of New York, removes one long recognized as among the foremost pediatricians and diagnosticians of his time.

Dr. Winters was born at Minnisink, Tioga County, New York, January 11, 1848, and died October 4, 1922. From childhood he possessed an earnest desire to become a physician, and entered upon the study of medicine with Dr. George P. Cady, of Nicholas, Tioga County, New York. Coming to New York City in 1869, young Winters matriculated at the Medical Department of the University of New York, from which he was graduated in 1872.

In 1873-4 he became House-Surgeon at Bellevue Hospital, and in 1874-5 House-Physician. From 1875 to 1879 he acted as Assistant Pathologist and Curator to Bellevue Hospital. An ardent student of anatomy, he enjoyed special advantages as demonstrator and instructor under that most brilliant master, Prof. Darling of the University Medical School, holding the position from 1873 to 1885. In 1875 he became assistant to Prof. Alfred L. Loomis in teaching physical diagnosis in Bellevue Hospital. From 1881 until 1898 he was a member of the teaching staff at the University Medical School, as lecturer, clinical professor and professor of the Diseases of Children. In 1882 he was appointed attending physician, Department of Diseases of Children, to the Demilt Dispensary, then a leading institution of its kind, and, in 1877 under Lefferts and others, the first to develop a regularly organized system of instruction for graduates in medicine, the prototype of the present Post Graduate School. Here it was that Dr. Winters began his distinguished career as a specialist in pediatrics. In 1898 he withdrew from New York University to accept the professorship of Diseases of Children in the Cornell University Medical College. This position he held during the period of the War until the summer succeeding the armistice, when he resigned.



DR. JOSEPH EDCIL WINTERS

While still an interne of Bellevue Dr. Winters became associated with the late Dr. Joseph W. Howe, professor of Surgery at the University Medical School and master of the most successful "Quiz Class" of the time. For many years the fame of "Winters' Quiz" was unrivaled. His ability as an instructor amounted to genius. Consequently, he attracted the very best students and thus acquired a large and influential following of loyal and lifelong friends. "Winters' Quiz" was discontinued only when, through radical changes of policy, the colleges took over such instruction to themselves.

Dr. Winters was the author of various monographs on the feeding and care of infants and children, on rheumatism, and diseases incident to childhood. These papers were landmarks in the progress of pediatrics. No one of his time contributed more effectively to the wellbeing of the young. The expression "A Winters' baby" became a generic term descriptive of fine development and perfect health.

His capacity for work was extraordinary, his industry untiring, always with unswerving honesty seeking the truth. Of quick perception, full and ready knowledge, and remarkable diagnostic ability, his uprightness, gentleness, sympathy and rare unselfishness made him the ideal physician and the trusted friend.

Thus his distinguished career was no mere freak of fortune. Clearly it was the result of four fundamental elements, namely, fine heredity and personal physique; uplifting environment; rare earnestness of purpose; exceptional intellectual power. Beginning absolutely upon his own resources, he succeeded because success with such qualifications was inevitable.

In addition to his other activities Dr. Winters was visiting physician to the Willard Parker and Riverside Hospitals, Christ's Hospital, Jersey City, and St. Joseph's Hospital, Yonkers; also to the Mount Vernon and Flushing Hospitals and emeritus consultant to the Hebrew Sheltering Guardian Society. He was a Fellow of the New York Academy of Medicine, of the American Medical Association, of the American Pediatric Society, a member of the American Tuberculosis Association, the American Association of Milk Commissions, the Society of the Alumni of Bellevue Hospital, a charter member of the Medical Association of the Greater City of New York, a life member of the Society for the Relief of Widows and Orphans of Medical Men, the Physicians' Mutual Aid Association, the American National Red Cross, the Association for the Protection of the Adirondacks, and the United States Navy League. He was an honorary member of the Jenkins Medical Society of Yonkers, the Queens-Nassau Medical Society, the Tri-State Medical Society, the Essex County Medical Society, and the Lehigh Valley Medical Association.

In 1881 Dr. Winters was married to Miss Annie Carnochan Ludlow, daughter of Thomas William Ludlow 3rd, Esq., of Yonkers, N. Y., and of Frances Fraser Bettner, his wife. His widow and an only child, Miss Mary Ray Winters, survive him.

OUR LATIN-AMERICAN LETTER.

(*From our own correspondent*)

Balboa Heights, C. Z., *December* 5, 1922.

MALARIA.

The Panama Canal is the mirror in which the American people reflects itself to its Latin brothers. Of course, the ships of all nations which transit the Canal and the citizens of all the world who traverse the strip of United States territory from ocean to ocean carry away with them some of the national ideals so wonderfully symbolized by the greatest engineering accomplishment of the human race, but it is upon Latin-America that the effect is greatest. The medical and sanitary phases of this gigantic undertaking have been widespread in their influence and a considerable proportion of the public health progress in the tropics of the Western Hemisphere is directly due to them. There was therefore a very genuine regret and some slight apprehension when a representative of a Panama Canal local of a trade's union was quoted by the New York *Times* of July 5 last to the effect that "the wonderful sanitation program which General Gorgas installed on the Canal Zone has been destroyed." Upon investigation this was not substantiated nor was the further statement that there existed "an epidemic of malaria and fever among Canal employees." Through the courtesy of Col. H. C. Fisher, Medical Corps, U. S. A., the Chief Health Officer, all data relative to the incidence of disease in the Canal Zone have been made available to your correspondent and, as is shown by the following table, malaria is not as prevalent among the employees of the Canal as it is in many parts of the United States; in fact, the rate for October, 1922, is the lowest for that month since 1918:

Malaria Incidence 1,0C0 Employees, The Panama Canal.

January, 1918—October, 1922.

Month	1918	1919	1920	1921	1922
January	2.53	2.95	2.62	1.52	1.08
February	2.54	3.57	1.51	1.21	1.29
March	2.03	4.34	1.57	1.19	0.56
April	2.24	1.66	0.22	0.37	0.28
May	1.86	2.72	0.36	0.72	1.65
June	1.50	3.53	2.44	1.69	1.96
July	1.66	7.04	1.97	1.89	2.21
August	1.93	3.15	2.75	1.87	1.65
September	0.98	2.06	2.31	1.13	2.03
October	0.76	1.03	2.36	1.01	0.89
November	1.51	1.48	1.25	0,88	*
December	3.40	2.00	1.17	1.37	*

*Data secured November 15, 1922.

During the calendar year, there has been an increase of malaria cases over previous years among Army and Navy personnel. This is accounted for by the fact that this class of Canal resident goes for military maneuvers into the endemic malaria areas adjacent to the Zone which is sanitated by the American government. Even among this class, the malaria noneffective rate is surprisingly low. The general health of the sanitated area continues to improve, in fact the death rate for 1921, 7.52 per thousand, was the lowest in the seventeen years of American occupation. No apprehension need therefore be felt by the outside world that the Panama Canal is in any way departing from the public health program which permitted its creation.

FOOT AND MOUTH DISEASE.

On account of the reported prevalence of foot and mouth disease in Jamaica, horses, mules, asses, cattle, sheep, swine, goats, chickens or any other domesticated fowls, hides or skins of any description, hay, grass, straw and goods packed in the same, have been prohibited entry into the Canal Zone or the cities of Colon or Panama, from Jamaica.

NARCOTIC DRUGS.

The Acting Governor of the Panama Canal, in a circular issued October 23, 1922, relative to the enforcement of the Narcotic Drugs Import and Export Act of May 26, 1922, states: "On account of the smuggling of narcotic drugs into the Canal Zone and Canal ports . . . take all possible precautions to cooperate with the authorities . . . in breaking up this pernicious traffic in habit forming drugs. From the number of cases of smuggling in which the crews of vessels have been implicated, it would appear that proper steps have not been taken by the masters of vessels to prevent such smuggling. Members of the crews who have been caught smuggling narcotic drugs or are known to be dealers in narcotic drugs should . . . not be brought to the Canal Zone either as members of the crews or passengers."

MEDICAL MEETING.

The monthly meeting of the Medical Association of the Isthmian Canal Zone which was held at Ancon Hospital on November 17, 1922, was devoted entirely to reports of surgical cases as follows: Granuloma Inguinale, C. D. Holmes, M. D.; Osteogenesis Imperfecta, T. C. Brewer, M. D.; Fibroid of Uterus with Severe Anemia, and Sarcoma of Mesentery, H. L. Krafft, M. D.; Acute Intestinal Obstruction, L. B. Morris, M. D.; Gallstones at Ampulla of Vater, Hydropyonethresis with Uretral Calculus, and Harelip, H. K. Tuttle, M. D.

ORTHOPEDIC CLINIC.

The Rotary Club of Panama with the cooperation of Major Edgar A. Bocock, M. C., U. S. A., is endeavoring to extend the scope and usefulness of the orthopedic clinic in connection with Santo Tomas Hospital. A ward of ten beds has been set aside by Major Bocock, the Superintendent of Santo Tomas, for the exclusive use of crippled children, and each of the sixty local Rotarians is to assist by discovering children needing orthopedic care and in bringing them to the hospital for examination and treatment. The local press will cooperate by giving publicity to the movement.

DIPHTHERIA.

In an endeavor to control and eradicate diphtheria from the city of Panama, R. P., Dr. Henry Goldthwaite, the City Health Officer, with the assistance of the Panama Canal Board of Health Laboratory, has been making cultures from the throats of all school children since August 14, 1922. The work is proceeding rapidly. Of the approximately 11,000 children of school age in the city, 7,450 had been examined up to November 20, 1922. In this group, 174 carriers of which thirty-eight or twenty-two per cent. were virulent, were found. This is a rate of twenty-three per thousand for the carriers and of five per thousand for virulent carriers. Virulent carriers are admitted to Santo Tomas Hospital immediately upon discovery and placed under appropriate treatment, tonsils and adenoids being removed and other nasopharyngeal foci being cleared up. The results have been most satisfactory to the Chief Health Officer of the Panama Canal under whose general direction all health work in the Canal Zone and the terminal cities of Colon and Panama is carried on.

SHIP FUMIGATION.

The Chief Quarantine Officer, Dr. W. C. Rucker, immediately upon his return from the United States instituted as a routine practice the use of cyanogen chloride in the fumigation of ships for the destruction of vermin.

OUR LONDON LETTER.

(*From our own Correspondent.*)

London, December 10, 1922.

HOLLANDER ON INSANITY.

Dr. Bernard Hollander, an authority in this country on mental disorders, said the other day that his extended and varied experience in the treatment of mental patients had convinced him that one of the most pressing needs of the community was to find the means of diminishing, if not actually preventing insanity, and that one of the steps in that direction was the early treatment of mental disorder, which is hindered by the present Lunacy Laws: 1. Facilities to treat suitable mental cases for a period not exceeding six months without "certification." He pointed out that it is a hardship that persons only slightly deranged and conscious of their condition should be forced against their will into asylums, where they form one of a crowd of patients, many much worse than themselves, and addicted to disgusting language and habits. 2. Greater facilities are needed for the organized study and research of insanity. 3. All institutions for mental patients, public and private, should be made open institutions by law; that is to say, in addition to the resident medical staff, visiting physicians should be appointed and have a certain number of patients allotted to them, the same as is the case in other diseases treated in general hospitals. According to Dr. Hollander this would do away with the frequent accusations of wrong detention and ill treatment, and would enable the one measure essential for the recovery of these patients, namely, individual treatment. Many asylums have one to two thousand patients and a staff of only three or four physicians. 4. There should be no more "licensed houses" which any man without any qualifications for the work can purchase as a business speculation. Licenses should be granted to "individuals" only, such as, by their training and experience, can be recommended for them.

A new Lunacy Act is about to be introduced into the House of Commons ere long. Reforms in this direction seem to be needed badly, very severe criticisms having been brought recently against the conduct of asylums generally. It is beginning to be recognized now that certain forms of mental disorder, if taken in time, can be cured, and that the treatment of a sick mind is analogous in some respects to that of a sick body; in fact, some forms of mental abberation—dementia præcox, for example—have been ascribed recently by well known alienists to a physical basis.

There is little doubt that mental hygiene, properly carried out, will prevent some cases of mental disorder from proceeding further; at any rate, mild cases should not be allowed to mix promiscuously with really bad cases. This is not the way to improve such cases, but to render them worse. Reforms are called for in the management and treatment of mental disorder in every country.

PASSING OF GOUT.

Sir William Wilcox recently drew attention to the fact that true gout is practically incurable. Indeed, few cases are now seen of old fashioned or classical gout and the modern tendency is to overlook it. One of the very best books written on gout is by Dr. R. L. Jones Llewlyn, published by Heineman of London. It deals with gout in all its manifestations, including its modern manifestations. With the writers of fifty or sixty or more years ago gout was one of the diseases most frequently mentioned. In the *Pickwick Papers* the following conversation is related to have taken place: "Well done, father," said Sam. "Take care, old fellow, or you will have a touch of your old complaint, the gout." "I've found a sov'rin cure for that, Sammy," said Mr. Weller, setting down the glass. "A sovereign cure for the gout," said Mr. Pickwick, hastily producing his notebook. "What is it?" "The gout, sir," replied Mr. Weller, "the gout is a complaint as arises from too much ease and comfort. If ever you're attacked with the gout, sir, just you marry a widder as hae got a good loud voice with a decent notion of using it, and you'll never have the gout again. It's a capital prescription, sir. I takes it reg'lar and I can warrant it to drive away an illness caused by too much jollity." Having imparted this valuable secret, Mr. Weller drained his glass once more, produced a labored wink, sighed deeply and slowly retired.

AMERICAN MILK SUPPLY.

Professor John Robertson, M. O. H., Birmingham, has returned recently from a visit to America, and on November 17 last, at a meeting of the Society of Medical Officers of Health held in London, read a paper on the American Milk Supply. Professor Robertson had visited the large towns of the New England states and the Central Bureau of Milk Control. He formed the opinion that the general milk supply was definitely better in America than in this country. It gave a certain assurance of clean conditions of production and of proper methods of distribution and handling. The American public could rely upon a milk which was richer in quality than that in this country, cleaner, of better keeping properties, and free from the risk of carrying infectious diseases or tuberculosis. The result of this had been that the American town dwellers had been induced to use an amount of milk much greater than the consumption in this country. Moreover, Professor Robertson pointed out that the improved American methods of dealing with surplus milk also tended to a lowering of the price. Although the price in America was nominally higher than in Great Britain, yet, when the purchasing power of the dollar was taken into consideration, it was, in effect, lower.

Book Reviews

TUBERCULOSIS.

Tuberculosis and the Community. By John B. Hawes, 2nd, M.D. Lea & Febiger, New York, 1922. Pp. 168.

This is a remarkable little volume, perhaps the first of its kind to treat tuberculosis distinctively in its social aspect. In the historical chapter one might find some serious omissions, but in view of the small size of the book this may be pardoned. However, since the author speaks of the German pioneers the omission of Dettweiler's name is unfortunate, particularly since in the early nineties of the last century he established the first sanatorium for the consumptive poor. In the same chapter there is an unfortunate printing mistake. In quoting Laennec's work the author uses the words "auscultation mediale" which would mean "middle auscultation," instead of "auscultation mediate." There is only one letter wrong but it makes quite a difference in the meaning. It is gratifying to see the beautiful tribute paid to Dr. Trudeau in this chapter and also to the pioneer work of Dr. Vincent Y. Bowditch.

In the chapter on the Frequency of Tuberculosis and the results obtained by the modern methods of combating the disease, the author is just a trifle too chauvinistic when speaking mainly of the results obtained in Massachusetts and omitting entirely the pioneer work which was done in New York long before Massachusetts followed the example of the campaign so successfully inaugurated by Dr. Hermann M. Biggs. The chapter dealing with the Cost of Tuberculosis is admirable and so are the two following ones on Hospitals and After Care. The value of Dispensaries is clearly set forth in Chapter 7. The chapter on Tuberculosis and the Nurses is divided into sub-chapters, the importance of each of which speaks for itself. They are: "The Training ing of the Tuberculosis Nurse," "Institutional Nursing," "The Field for the Public Health Nurse in Tuberculosis Nursing," "Details of Public Health Nursing in Tuberculosis," "Home Treatment," "Working Hours," "Salaries," "Records and Record Keeping," "Tuberculosis Surveys," "Clinics."

In the chapter on Tuberculosis and Its Relation to Schools nothing new is advanced, but at the end of it the author quotes Dr. F. P. Dressler's statement which appeared in the Bulletin of the U. S. Bureau of Education of 1912, as follows: "The normal with many of them is the abnormal. It seems more than foolish to shut up our well children in unventilated and improperly lighted rooms, furnish them no playgrounds, compel them to live a life not in accord with the laws of physical development and then when they become anemic, nearsighted or defective, make a great stir about special classes for defectives, and spend in building special schools money better spent in keeping children well . . ." The reviewer has repeated this strong statement because it shows the crux of the actual school situation in many cities of the United States. In the chapter on Tuberculosis and Housing the author quotes mainly from the work done in New York by Dr. Biggs, in France by Lagneau, and in Edinburgh by Williamson, which are familiar to all students of the social aspect of tuberculosis and bear out the oft-repeated maxim "Tuberculosis is a home and house disease."

In the chapter on "Tuberculosis and Occupation" periodical examinations and sanitation of workshops and factories and the selection of men and women making it possible to give men the kind of employment that they are physically adapted to engage in, is recommended. Chapter 12 deals with the Tuberculosis Programs in small Cities and Towns, and as an example he refers to the Community Health and Tuberculosis Demonstration in Framingham, Mass. In the chapter on Bovine Tuberculosis proper control is emphasized. Chapter 14 deals with the Incorrigible Consumptive, and here the author touches on official phthisiophobia and official phthisiophilia, and at the end of the chapter says: "For many years to come the problem of the 'incorrigible consumptive' will be a difficult and distressing one. Its solution means education of children, education of their parents, education of the medical profession, and education of legislators." The last chapter of this remarkably interesting little book is devoted to the methods of the tuberculosis campaign which are so familiar that they do not need recapitulation here. For anyone interested in the social aspect of tuberculosis no more instructive volume can be recommended.

PULMONARY TUBERCULOSIS.

Pulmonary Tuberculosis. By Maurice Fishberg, M.D. Third Edition, Revised and Enlarged. Illustrated With 129 Engravings and Twenty-eight Plates. Lea & Febiger, Philadelphia and New York, 1922. Pp. ix-891.

Dr. Fishberg's book has established itself so firmly as the authoritative textbook on pulmonary tuberculosis that the new edition is sure of a cordial welcome. It is a new edition in fact as well as in name, for the entire book has been reset, several chapters have been rewritten, notably the ones on phthisiogenesis and on artificial pneumothorax, and many new sections have been added.

It is refreshing to read a book that reflects the vivid and original personality of its author. The writer's fundamental knowledge of his subject is shown in the keen critical comments that appear on almost every page. The literature of tuberculosis is very completely represented, indeed this is one of the distinctive assets of the book, particularly because it has been critically selected and its discussion illuminated by the exposition of the personal experience of the author.

Dr. Fishberg does not hesitate to express heterodox views on many phases of the tuberculosis problem. On investigation, however, it is found that they are usually well supported by facts. It is interesting to note that a number of points of view which the author defended almost alone five years ago have become the common possession of tuberculosis specialists today.

The two new chapters on The Reciprocal Relations Between Pulmonary Tuberculosis and certain Physiological and Pathological Processes and on the Medical, Legal and Insurance Aspects of

Tuberculosis merit special mention. In the first of these the influence of tuberculous infection on growth, puberty, menstruation and a number of other physiological processes is ably discussed. The apparent antagonism between lymphatism and progressive tuberculous diseases is pointed out. The reciprocal relations between pulmonary tuberculosis and many other affections are well presented. The author's careful clinical observations appear in many passages. He reports, for instance, that nephrolithiasis and cholelithiasis are rare in tuberculous subjects.

In a chapter on the medical and insurance aspects of tuberculosis the author discusses the disability resulting from tuberculosis and points out that many tuberculous patients are able to pursue gainful occupations. The treatment of the subject of traumatic tuberculosis of the lungs is very complete and the discussion of the medical examination for life insurance is adequate and very timely.

Dr. Fishberg's work is one of the rare textbooks that is not a mere compilation of what others have written before, but one that represents the fruits of long experience of an able clinician, a master of his subject from both the theoretical and practical aspects, who possesses a clear and lucid style. It is a book that is indispensable not alone to the general practitioner but to the internist, tuberculosis specialist and public health worker as well.

JOURNALS ON TUBERCULOSIS.

The American Review of Tuberculosis, vol. vi., Nos. 3, 4 and 5. Journal of the National Tuberculosis Association, Allen K. Krause, Editor.

The numbers of *American Review of Tuberculosis* for May, June, and July, 1922, present such a wealth of information on tuberculosis science, that in order to do justice to the many excellent articles these numbers contain, one would have to write much more than can be contained in a review.

Because so much is claimed by European, particularly German investigators, for the results obtained by chemotherapy in tuberculosis, through the use of some arsenic and silver compounds, that the conclusions of Maurice I. Smith are highly interesting. They are in brief as follows:

1. Neoarsphenamine and silver arsphenamine have a very slight inhibiting action on the growth of the tubercle bacillus in vitro. Colloidal silver oxide has no effect whatever on its growth, while silver methylene blue has a very considerable inhibiting action on its growth.
2. None of these substances has any demonstrable effect on the pathogenicity of the tubercle bacillus when exposed to their action in vitro at body temperature for forty-eight hours.
3. None of these substances when administered to experimentally infected tuberculous guineapigs has any favorable influence on the course of the disease.

Dr. James Alexander Miller, in his presidential address, entitled The Power of the Spirit, pays a beautiful tribute to the founder of modern American phthisiotherapy, the immortal Edward Livingston Trudeau.

Haven Emerson's article describes the many causes which have led to the remarkable decrease in the deathrate from tuberculosis under the three principal headings:

First, Specific Measure: such as early physical diagnosis, bacteriological diagnosis, notification, segregation, ordinances against indiscriminate spitting, pasteurization of milk, etc. Second, under Accessory Factors, he mentions reduction of infant mortality, nutritional protection of children, open air classes, improved housing, and general education. Third, under Accidental Factors, he mentions limitation of immigration, war service by putting under favorable condition predisposed individuals between the ages of twenty-one to thirty-one, higher wages, shorter hours and better feeding, prohibition, undiscovered tuberculosis because of influenza, and favorable climate, 1920 to 1921. He concludes this highly instructive article by saying:

"We must expect a slackening in the rate of reduction as the effects of the influenza epidemic subside, but if employment on a good level of remuneration is reestablished, and the reaction against the Eighteenth Amendment subsides, there seems to be no good reason to doubt the continuance of a decline in tuberculosis mortality in this country at a rate at least as rapid as has prevailed for the past twenty years in the United States or in Massachusetts or in New York City."

Of intense historical interest is Dr. Krause's scholarly article on the Practice of Artificial Pneumothorax by the Hippocratic School. It only proves that there is nothing new under the sun and that even the great Forlanini and our own late Dr. Murphy, of Chicago, had their predecessors.

The first article is a report on findings in the chests of normal children by Pancoast, Batjaer, and Dunham, which is invaluable because it clears up many heretofore obscure points in the diagnosis of tuberculosis in childhood.

Dr. Knopf's article entitled A Physical Adjuvant in the Rest Cure of Pulmonary Tuberculosis, concludes the series of interesting contributions on modern tuberculosis science. A condemned report on the experiments described therein particularly intended for the general practitioner, appeared in the New York Medical Journal of July 19, 1922. Dr. Knopf's adjuvant has for its main purpose to add local rest of the lung to the general bodily rest for the tuberculous patient.

All three numbers of the *Review* contain the usual valuable abstracts from the current tuberculosis literature of Europe and United States.

TUBERCULOUS PERITONITIS.

Behandlung der tuberculosen Bauchfillerkrankungen in Kindesalter. (Sammlung von Verdauungs-und-Stoffwechselkrankheiten). Von H. Finkelstein und E. Rohr. Halle a.S: Carl Marhold Verlagsbuchhandlung, 1922.

Finkelstein and Rohr give a summary of their experiences with tuberculous peritonitis in children. Considerable ascites, which shows no tendency to subside, should be tapped. In adhesive peritonitis sun therapy combined with plenty of nourishment and good fresh air does a great deal of good. X ray therapy is also at times beneficial. Intestinal tuberculosis and the ulcerative form of tuberculous peritonitis are most resistant to every form of treatment.

MENTAL DEFICIENCY.

Mental Deficiency. By A. F. Tredgold, M.D., M.R.C.P., F.R.S., Ed. Fourth Edition. Revised and Enlarged. New York: William Wood & Co., 1922. Pp. xx-569.

This is the fourth edition of a work of extremely high order. An earnest effort is made for a better understanding and a more sensible classification and handling of the feebleminded. The manner of presentation is most lucid and this very simplicity makes it useful to the practitioner without detracting from its high scientific worth. Numerous new concepts, formulated by the author, which have appeared recently in various publications, have been included in this last edition. There is a profusion of case histories, photographs, and a number of ingenious diagrams throughout the work. The world's literature on amentia has been carefully gone over and included. One of Tredgold's most interesting suggestions is that of an international nomenclature dealing with various types of amentia. This is worthy of serious consideration. His scheme is a sensible one and some effort should be made to bring about a change such as he suggests.

DIAGNOSIS.

Lehrbuch Linischer Diagnostik und Unter suchungsmethodik fur Studierende, Medizinal praktikanten und Aerzte. Von Prof. Theodor Brugsch und Prof. Dr. Alfred Schittenhelm. Fifth Edition. Berlin and Vienna. 1921: Urban und Schwarzenberg.

The present volume comprises 968 pages and 418 text figures. In their preface the authors style the late war and reconstruction period "the Revolution." The work appeared originally in 1908, the third edition just before the war and the fourth in 1918. The size has undergone but little change since the first appearance of the work. The postbellum era has seen a reawakening of scientific ardor and the authors have given their readers the full benefits of electrocardiography and abdominal röntgenography. Other advances are in the application of micromethods to diseases of metabolism and a revision of the symptomatology and diagnosis of uterus. The Aschoff school is followed in dealing with tuberculosis.

PRACTICE OF MEDICINE.

A Text Book of the Practice of Medicine. By Various Authors. Edited by Frederick W. Price, M.D., F.R.S., Edin. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton, 1922. Pp. 1753.

With the assistance of twenty-five authorities on the subjects with which they deal, Dr. Frederick W. Price, well known as a leading cardiologist, has produced a most able and valuable work, including sections on Diseases of the Skin and Psychological Medicine, and Tropical Diseases, in one volume. The book is intended for general practitioners and senior students, and for this reason is eminently practical, no place being found for history, and pathology is curtailed, while etiology, symptoms, diagnosis, prognosis and treatment are thoroughly considered; indeed, we know of no work of its size in which the last named has received so much attention. The book is divided into twenty sections, of which the first contains an excellent article on Fever by Dr. M. S. Pembrey, followed by the consideration of Infection, Immunity and Immune Therapy, by Sir Thomas Horder and Dr. John Matthews, to which we would particularly draw attention. Diseases of the Circulatory System, by the editor, with numerous figures of heart and pulse tracings, and those of the Respiratory System by Dr. R. A. Young and Dr. G. E. Beaumont, and of the Nervous System by Dr. James Collier and Dr. W. J. Adie, are invaluable, and if for these only the book would be well worth purchasing. Dr. C. R. Box's description of the Infectious Fevers is concise and to the point. In the section dealing with Diseases of Metabolism, Dr. George Graham writes on Diabetes, describing the method of treatment to which his name is usually gvien. Dr. A. F. Hurst is responsible for Diseases of the Digestive System; in some instances, perhaps, the treatment suggested is beyond the scope of general practice. Gaskell's classification has been adopted by Dr. W. Langdon Brown and Dr. Geoffrey Evans in their wellwritten articles on Diseases of the Kidneys. Sections 16 and 17, devoted to a consideration of the Diseases of the Joints, Fibrous Tissues and Muscles, and of the Bones, by Sir W. H. Willcox, are well described, and the same authority is naturally responsible for Diseases due to Chemical Agents. Diseases of the Skin by Dr. A. M. H. Gray, and Tropical Diseases, by Dr. G. C. Low, are well treated, and Psychological Medicine also is given full consideration. The book is easy to handle, and within its 1,753 pages a wonderful amount of information is contained. The editorial work has been well done, and the editor is heartily to be congratulated, both as regards his own part of the work and his choice of the contributors. We know of no book on medicine in one volume which can be compared to it, and it cannot be too highly recommended.

PHYSIOTHERAPY.

Manual of Physiotherapeutics. By Thomas Davey Luke, M.D., F.R.C.S. (Ed). New and Revised Edition. Wm. Heinemann Medical Books, Ltd.

Physiotherapeutics on the treatment of disease other than by drugs has come greatly into vogue during recent years, although even now it does not hold so prominent a place in the medical curriculum and practice of medicine as its importance deserves. As a matter of fact, on account of a lack of training in such methods, the ordinary medical practitioner has vague ideas as to when and how to apply them. Nowadays, the public require that the medical profession should be in touch and have some knowledge of every method of cure. In the volume before us the author deals with all therapeutic measures included under the term of physiotherapeutics, baths, massage, rest, electricity and diet. While the British health resorts are accorded a due meed of praise, the author warns against two classes of so-called hydropathic establishments, those which are to all intents and purposes quite ordinary boarding houses and those which although given the high sounding name of hydropathic establishments are no more nor less than pleasure resorts in which there are no facilities for treatment of any kind. Vibratory treatment is given high praise. The concluding part discusses briefly dietetic treatment and tea is considered a beverage only second in its injurious effects to alcohol. While the statement is somewhat of an exaggeration, many would regard coffee when taken in large quantities as more harmful than tea, there is little doubt that perhaps the majority of English people drink more tea than is good for their health. On the other hand, it is more than likely that Americans impair their digestive functions by imbibing too much coffee. The book is well bound, well printed and excellently well and adequately illustrated.

THERAPY.

Greundriss der Klinischen Therapie inner Krankheiten. Von Prof. Dr. Georg Klemperer. Berlin und Vienna: Urban & Schwarzenberg, 1922.

The author with whom Dr. L. Dunner has collaborated in getting out the present volume, divides his subject matter as follows: general treatment of the sick individual; infectious diseases; diseases of the digestive, respiratory, cardiovascular, renal, hemic, arthritic and nervous systems; and disorders of metabolism.

The author has for many years edited the periodical *Therapie der Gegenwart* and is one of the best known therapeutists in the world. An extensive formulary is appended.

MASSAGE.

Massage and Medical Gymnastics. By Dr. Emil A. G. Kleen and Various Contributors. Second Edition. Price $7.00. New York: William Wood & Co., 1921.

Kleen's original treatise on massage appeared in Swedish in 1890 and was promptly translated into German and English. In 1918 the work was brought up to date through the collaboration of Dr. Arvedson, Dr. Haglund, and Dr. Zander, and an English translation was made by Mina L. Dobbie. The second or present edition has been carefully revised by the translator. Dr. Kleen is still the responsible editor of the work, and finds that in the past two decades there have been but little to add to the teaching of massage. Dr. Arvedson contributes the section on Lung's medical gymnastics; Dr. Zander that on the Zander system of exercises, while Dr. Haglund writes of massage and gymnastics in orthopedics. Of the original editions up to 1918, 3,000 copies had been sold, and the present revision will doubtless meet with the same degree of success.

TROPICAL HYGIENE.

Aids to Tropical Hygiene. By Col. R. J. Blackham, C.B., C.M.G., M.D. Second Edition. New York: William Wood & Co., 1922. Pp. vi-240.

This compact little volume gives an extremely interesting résumé of the entire scope of tropical hygiene and public health service. Though it would seem from the technicality of its language to have been prepared with the professional student of tropical medicine or the public health officer in mind, it is not for that reason without interest and significance for the nonprofessional reader. The author admits that tropical and subtropical regions are unsuited to the more civilized races and assigns as the probable reason for the decline of the tropics, "originally the source of human culture," the spread of the socalled tropical diseases by multiplication of facilities for intercommunication, and first among these tropical diseases he places malaria, closely followed by the various other tropical fevers.

The discussion of soil and climate, air and water, food and clothing, the disposal of refuse and the disposal of the dead, treats in detail conditions as they exist and as they might be improved. The chapters on Water and Water Supplies, Insects, Arachnids and Rats, Animal Parasites, and particularly that on the Prevention of Malaria, are most illuminating and informative.

The work is valuable not only professionally to the student of hygiene and to public health officials, but is intellectually entertaining from its concise composition and smooth style in the discussion of sanitary matters. Col. Blackham's book should have an appreciative reception from American readers generally.

GOUT.

La Goutte et al Cure Hydro-minerale. Par le Professeur agrege. Maurice Loeper, et les Docteurs Flurin. Glenard, Joly, Paillard. Piatot et Pierra. Paris: L'Expansion Scientifique, 1921.

This brochure of 144 pages comprises seven essays. Loeper begins with uric and oxalic acid gout. Piatot discusses the articular, muscular and remalgiform symptoms of gout, Joly gouty phlebitis, Flurin gouty bronchitis, Pierra uterine congestion of the gouty, while Paillard and Glenard cover the hydromineral treatment of gout.

AMERICAN LITERATURE.

Erik Dorn. By Ben Hecht. New York and London: G. P. Putnam's Sons, 1921. Pp. 409.

Gargoyles. By Ben Hecht. New York: Boni & Liveright, 1922. Pp. 346.

Eric Dorn is a charming blend of realism impressionistically told and in the very impressionism we get a hint of the fantasy which prompts the behavior of the characters it brings to life. Hecht has done something that is likely to be little appreciated. He has sought motives that prompt the action of his characters. In his *Gargoyles,* his more powerful book, this is more apparent. Some will be disappointed by Hecht's writings at not being sufficiently shocked. Others will be too shocked to read very far. With these critics we shall not concern ourselves. We are mostly interested in what Hecht has done, not in depicting life, and even death for that matter, and yet his work is splendidly truthful here—but in his ability to find motives for the activities, compensations, inadequacies, adjustments and maladjustments of his characters.

To depict sorrow and joy, to tell about what is going on brilliantly is no longer enough. We have gone beyond this. We now want to know why—at least some of us—and Hecht has a tendency to seek the reason. With the advent of Henry James we found psychology intruding into fiction. Thoughts, the most minute ones, were chased from one person to another, back again to cause and effect, and off again. It was equivalent to the development of the experimental psychology of his day, perhaps it was even a little in advance of his day. Then Dostoievsky gave us his unrivaled subjective-objectified psychopathological fiction studies. He did much probing and searching, and made some exceedingly farsighted observations, many of them corroborated by most modern psychopathology.

Hecht attacks from a new angle. He takes the attitude of the modern psychopathologist and seeks causes. He is not always letter perfect in his deductions, but in many instances he comes near enough to the truth to make it uncomfortable for those readers who only want to be entertained. To those interested in the why of human behavior—and among physicians there should be some such—his works will find full favor, be read carefully and with profit.

In *Eric Dorn* a dazzling ray of light is turned on to the world of law and then flashed into the realm of newspaperdom. The chapter on the old man is an excellent portrayal of senescence. Then we have a study of an unsatisfied love life which has, as its twisted root, a fluctuating bisexuality with a final attempted return to a mother image. *Gargoyles* is more pretentious and more farreaching. The characters are multiplied and the interweavings are more complex. Mercilessly he flays the demivirgin and shows her in her true colors. Fearlessly he shows the cravings for power, for wealth, for achievement, for show, for pomp, for splendor, for fame, and then, as the days close on the futile life efforts, the beating of the empty drums is heard dimly in the distance. Layer after layer of false covering is removed.

Do not read Hecht if you are squeamish. Do not read him if you do not want to face truths. It is only by facing them that we can ever alter anything in the slightest degree. Somehow it seems that Hecht has told his story before we were strong enough, or adult enough to hear it and face it. For some of us he comes as a clear, driving wind, bringing us face to face with Nature as it is.

THE PHYSICIAN AND POETRY.

Collected Poems. By EDWIN ARLINGTON ROBINSON. New York: The MacMillan Company, 1921. Pp. xi-592.

Early Tudor Poetry. By JOHN M. BERDAN. Studies in Tudor Literature, 1485-1547. New York: The MacMillan Company, 1920.

Highland Light and Other Poems. By HENRY ADAMS BELLOWS. New York: The MacMillan Company, 1921. Pp. x-135.

Modern Russian Poetry. An Anthology. Chosen and Translated by BABETTE DEUTSCH and AVRAHM YARMOLINSKY. New York: Harcourt, Brace & Co., 1921. Pp. xix-179.

How much does the medical man need poetry? Many a physician will say scornfully: "Not at all." He is afraid of betraying himself, of opening some sentimental chink in his armor of complacence. Yet he will admit that the healthy man needs a varied diet. Why not variety in mental diet as well?

So we give you poetry of different qualities and climes; within the field a varied diet in itself. Something into which to dig the teeth, to help you explore now that you have leisure, the mysterious hinterland of literature that perhaps you have not thought of since college days. In *Early Tudor Poetry,* John M. Berdan has made a fascinating and readable study of the subject. He shows how the shift in pronunciation of English shortly after Chaucer's days threw the literary world off its balance for a time. Chaucer and his immediate followers became difficult to understand, even to read. The growth of Humanism in England sent writers groping after classic and medieval forms. There was no national tradition. Poetry wavered in transition from copied medievalism, influenced by the scholastic tradition, until towards the end of the reign of Henry the Eighth English poetry as we think of it began to be born. Yet without the Tudor introductory phase, so frequently overlooked, and if studied at all, gone into in very little detail, Elizabethan poetry, Shakespeare and his contemporaries, might have been far otherwise. In the course of six complete essays Berdan has outlined in masterly fashion the literary history of the Tudor period. And many rare examples of the writings of that day render the book still more pleasing.

"Modern Russian literature took its rise in the early nineteenth century. This was, more or less, the Russian counterpart of the Elizabethan Age." With these introductory words Babette Deutsch and Avrahm Yarmolinsky offer their anthology of *Modern Russian Poetry.* A century is covered, the elements of this poetry discussed, the general trends indicated. Then in chronological order follow excerpts from the works of Pushkin and his successors. The outline of personal history preceding each group of poems is at times a little flippant, but the characterizations are no doubt just, so many actual, clear cut pictures of personality or near personality. When it comes to the translations of the poems, our admiration is unbounded. A very remarkable piece of work has been done. To make a poetic rendering of a foreign lyric is in itself difficult enough but to preserve rhythm, quality and rhyme scheme is truly a feat. The picture brought out in English cadences in Tyutchev's As Ocean's Stream is well worth quoting:

As ocean's stream girdles the ball of earth,
  From circling seas of dream man's life emerges,
And as night moves in silence up the firth
  The secret tide around our mainland surges.

The voice of urgent waters softly sounds;
  The magic skiff uplifts white wings of wonder.
The tide swells swiftly and the white sail rounds,
  Where the blind waves in shoreless darkness thunder.

And the wide heavens, starred and luminous,
  Out of the deep in mystery aspire.
The strange abyss is burning under us;
  And we sail onward, and our wake is fire.

From the formal perfection of the classic school to the revolutionary imagists, the transition has been subtly recorded. The powerful Hymn to Fire, by Konstantin Balmont, slipping like the fire's melody from gentle theme to leaping harmony, now hushed to rhyme, now pulsing high in flaming colors, is a splendid example of the poetic instinct in both author and translator. The recent imagist school has its own force like that of our escaped prophets. The crude things of earth it moulds into pictures of sound, rhythm, thought, each tinged to life by the artist's emotion. All in all, a noteworthy collection of little known poetry, thus made accessible to English readers in thoroughly satisfactory translation.

American verse in 1921 must be credited with two distinct achievements. Henry Adams Bellows's slender volume *Highland Light and Other Poems,* shows deft mastery. There are beautiful lyrics, powerful moments as in Undrowned—a sense of reality in all his work. The sea, Icelandic sagas, travel, combine in the work of this American of the great waste.

In the *Collected Poems* of Edwin Arlington Robinson we have the substantial contribution of America's foremost poet. The book is a treasure trove; in it one can wander at will through drama, tragedy, through keenly appreciated bits of local life, through sentient beauty in every form. The book is impossible to describe. It is poetry, great poetry.

PSYCHOLOGY OF LITERATURE.

The Literature of Ecstasy. By Albert Mordell. New York: Boni & Liveright, New York, 1921.

The author contends that the quality of ecstasy makes poetry, whether in prose or in verse. He finds greater poetry in prose works. He summarizes his theory:

"Ecstasy, imagination, and the unconscious are all convertible and synonymous terms for the primary source of poetry. They are the fruitage of the turmoil of the soul, due to apparently forgotten memories in us of the emotional lives in all our ancestors."

Unfortunately Mr. Mordell is inspired by little ecstasy in his own utterances. In correct thesic form he defines his terms, adduces every extant definition of poetry, practically all of which furnish him with the opportunity of reiterating his battle cry: There is more poetic prose than verse. He proceeds to prove his point by the use of countless authors' names, some well chosen passages. He discusses the psychology of creative utterance, and triumphantly concludes:

". . . poetry . . . is an emotional spirit holding literature in suffusion instead of being a branch of literature . . . we find . . . most of the old definitions of poetry exclude a great deal of the world's best poetry, and include much that is not poetry."

We are duly edified!

THE MIND IN POETRY.

The Poetic Mind. By Frederick Clarke Prescott, Cornell University. New York: MacMillan Company, 1922. Pp. 308.

This effort of Prescott's to better know the workings of the mind which creates poetry has been met with criticism by certain reviewers. Thomas Jewell Craven in the *Dial* for July, 1922, seems to be a worthy representative of this tribe of bombastic assertive ones who know with accuracy a great deal that is not so. He states that "Professor Prescott's cardinal blunder arises from his misunderstanding of the intentions of scientific inquiry. He is continually asking *why* instead of *how*. Science is not called upon to *explain* anything; its purpose is the description and correlation of sense impressions—no more and no less—and the validity of its investigations depends upon its close adherence to mental processes which are observable." There is more of the like but let this suffice. What would science do if there were no "mental processes" to observe as the case would be in the reading of Mr. Craven's review? There is more, much more, including a fair amount of fear about things which can be explained which leads Craven to say, ". . . it is not necessary to explain why a man writes poetry." It may not suit his purpose but medical psychology demands this, in the same critical fashion that it demands to know the "how" and "why" of the workings of the mind of the psychotic. It is to be regretted that Mr. Thomas Jewell Craven's dictates will not be allowed to prevent our continuing to ask the question of "why." This Prescott has done and done admirably. Modern psychology has given him the implements and he has used them effectively. He has shown that unconscious processes which may be traced with scientific accuracy are responsible for poetic creations. The book is replete with stimulating examples of the parallel between the unconscious mechanisms employed in the dream, in wit and in poetry. It is to be regretted that such infantile attitudes are taken regarding so serious and valuable a book as Prescott's by reviewers who are "critical" at the expense of being creative. The book is a distinct addition to the work of modern psychopathology and should give more light to the field of literature.

SYDENHAM.

Selected Works of Thomas Sydenham, M.D., By John D. Comrie, M.A., BSc., M.D., F.R.C.P. Edin. New York: William Wood & Co., 1922.

A most careful selection of the works of Sydenham. Those interested in the progress and history of medicine will find this book fascinating reading. Sydenham was an original thinker and, as Rabelais, he described many new syndromes and disease entities. These are emphasized in the present volume.

ATTITUDE TOWARD DEATH.

Aspects of Death and Correlated Aspects of Life in Art, Epigram and Poetry. By Frederick Parkes Weber, M.A., M.D., F.R.C.P., F.S.A. Fourth Edition. With 146 Illustrations. London: T. Fisher Unwin, Ltd., 1922.

The fourth edition of a most remarkable survey of the literature and art dealing with the topic of death and the correlation aspects of life. Much material direct and symbolic is presented. As a reference textbook it is exceedingly valuable.

DOBELL.

The Clinical Method in the Study of Disease. By R. M. Wilson. With a biographical note on the life of Dr. Horace Dobell. London: Oxford Medical Publications, 1922.

This little brochure contains an appreciation of Dobell's life and work. The influence of Dobell is clearly shown. It is a refreshing bit of writing and should serve as a stimulus to the general practitioner.

SYMPTOMATOLOGY.

Klinische Symptomatologie innerer Krankheiten. Von Hofrat Prof. Dr. Norbert. Erster Band. Zweite Teil. Korperschmerzen (mit Ausnahme der Bauchschmerzen). Second Edition. Berlin and Vienna: Urban & Schwarzenberg, 1921.

The first edition of this volume appeared in 1919 and has already been translated into English. According to the preface there was but little to add to the first edition. The various localities subject to pains considered in the book are cardiac region, loins, musculature in general, bones, joints, and head. A great drawback in a book on painful affections and pain is the total absence of illustrations.

Practical Therapeutics

LIMITATIONS OF BRONCHOSCOPY AND ESOPHAGOSCOPY.

By Charles J. Imperatori, M. D.,
New York.

Endoscopic procedures on the upper respiratory tract and the esophagus have reached a stage of exactness and precision that they should be more frequently applied as an aid to diagnosis and treatment of these parts. The internist's examination by the usual methods and the radiographic findings may all be satisfactorily oriented by the visual findings *per tubam.*

Of course, the term endoscopic, is almost synonymous with the removal of foreign bodies from these parts. There is no intention of decrying this important phase of endoscopic work, which in all but few instances is life saving; still, a larger field for these methods is as an aid in diagnosis and in local treatment. There are some limitations to these procedures and they should be understood as well as the indications.

Technically there are few instances in which the larynx, trachea, larger bronchi and esophagus may not be thoroughly visualized. Practically many adult patients refuse to permit the examination, either through fear of the instrumentation—having heard through others or having experienced, previously, inexpert methods. Inadaptability and noncooperation hinder considerably and make it necessary to resort to general anesthesia.

INDICATIONS.

In order to discuss the limitations of these methods it is primarily necessary to understand what are the indications for their employment. The indications may be briefly summarized as follows:

1. In diagnosis and treatment of all diseases of the hypopharynx, larynx, trachea, bronchi and esophagus. Also the stomach.
2. In those diseases, such as abscess of the lung, bronchiectasis and possibly asthma, where medicaments may be applied directly to the smaller bronchi.
3. As a means of diagnosis of the cause of hoarseness in infants and young children.

As confirmatory in diagnosis of diseases of the esophagus and in the treatment of strictures, whether organic or functional.

Especially is this method of use in confirmation of malignant disease of either the larynx or esophagus, but particularly the latter and without resorting to biopsy.

Gastroscopy is easily accomplished but the interpretation of the findings is difficult. To quote Schindler (1): "Many disease conditions that heretofore have not been clinically diagnosticable can now be recognized and brought under rational treatment. Gastroscopy should always precede an exploratory laparotomy for diagnostic purposes."

Exactly what are the limitations of these procedures? The patient, under observation, his age, his intended cooperation, the part to be examined, the anesthesia to be employed, the anatomical or pathological obstacles to be encountered, the time necessary for the examination and the immediate and the remote after effects, must of necessity all receive careful consideration.

Ordinarily advanced arteriosclerosis, with aortic aneurism and a kyphosis of the cervical vertebra, are the only contraindications that should deter one from doing a peroral endoscopic instrumentation, other conditions permitting.

Foreign bodies in the lung tissue have been successfully removed by Jackson. However, this procedure, that is plunging in the lung tissue from the nearest approach through a bronchus, in my opinion, except in selected cases, had better be referred to the thoracic surgeon or left to encapsulate themselves. All foreign bodies that have entered by the *via naturalis* can except in rare instances be removed endoscopically, perorally.

DIAGNOSIS.

Diagnosis of conditions in the larynx, trachea, bronchi and esophagus is as exact as the experience of the endoscopist is large. It is mainly a matter of accustoming oneself to differentiating the physiological from the pathological.

Regarding the treatment of bronchiectatic conditions and asthma, in my experience, patients suffering from the latter disease will rarely permit repeated treatments and conditions of bronchiectasis have been so infrequent, that no definite conclusions can be given.

In lung abscess, the attempts that have been made to relieve this serious condition have not been as successful as anticipated. In chronic lung abscess, and these seem to be all tuberculous, although the tubercle bacillus is rarely found in the sputum, the treatment per bronchoscope, with suction and irrigation, as suggested by Yankauer, has not given the hoped for results. Postural drainage has been as successful as this treatment and without the added danger, theoretical or otherwise, of infecting new areas of the pulmonary tissue.

CONCLUSIONS.

The best results have been obtained in those abscesses, that were acute and particularly following the inspiration of some foreign substance and in which the treatment was instituted within a short time after the onset. In pneumonia and influenzal abscesses this method of treatment does not give such good results.

In conclusion, it might not be amiss to say that the occasional bronchoscopist will always find these methods difficult and nonconclusive and, in so far as the patient is concerned—dangerous.

Methods such as these require repeated application in order to master the technic and the frequent observance of the cavities under consideration, in order to differentiate the physiological from the pathological.

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17 East Thirty-eighth Street.

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*Read before the New York County Medical Society, October 23, 1922.

TRANSPLANTATION FOR THE CORRECTION OF DEPRESSED DEFORMITIES OF THE NOSE.

By William Wesley Carter, M. D., F. A. C. S.,
New York

Many years have passed since I first became interested in the use of bone and cartilage transplants in the correction of that class of nasal deformities due more or less exclusively to a loss of bone and cartilage of the framework of the nose, and therefore observations drawn from experience with methods which have been subjected to the test of time may be of some value.

These cases constitute a distinct class and the principles of treatment are definite and are founded upon the laws of mechanics which govern the construction of the arch; for the framework of the nose, which of course has all to do with the maintenance of the elevation of the organ, is an arch composed of an indefinite number of bone and cartilage segments so placed that they form a curved figure which is selfsustaining when supported only at its extremities. The septum, as a vertical support, contrary to the belief of many, is not necessary in order to preserve the elevation of the nasal bridge, though it does strengthen the arch and its upper edge where it is fitted in between the lateral cartilages, fulfills the very important function of the keystone of this structure. In operations on the nose this fact must be kept foremost in mind, for many a case of depressed deformity has resulted from the submucous operation owing to the destruction or displacement of this important keystone through the carelessness or inexperience of the operator.

As previously stated, to correct the deformity, the arch must be restored, and this, in order that the correction may be permanent and the physiological relations between the different tissues which go to make up the nose may be maintained, should be done by replacing the lost structures by the introduction of tissues identical with those lost, these should be taken from the patient's own body and placed in the nose as quickly as possible. While in transit from one part of the body to another, the transplant should be carefully protected, it should be kept warm (the warmth of the operating room is usually sufficient), it should come in contact with no antiseptic or other protoplasmic poison, and the greatest care should be exercised to protect in every way possible the inherent vitality of its cells. I never place my transplant in saline solution, but take the graft just as it comes from the rib and wrap it up in a piece of sterile gauze and put it safely aside until the nose has been prepared for its reception. There is no need of preparing the nose first as I have previously advised, in fact experience shows that there is a distinct advantage in placing the transplant before the blood has had time to clot in the subcutaneous sac which has been formed by the elevation of the tissues over the nose. This sac should never be irrigated before the introduction of the transplant, but if the hemorrhage is severe and too much blood accumulates in the sac, it may be squeezed out. After the splint has been applied, the pressure of this instrument will control the bleeding.

I have long since abandoned my external incision between the eye brows, for the reason that a slight scar results and the incision is not at the lowest point of the subcutaneous sac into which the transplant is placed, therefore drainage is not as easily secured. From time to time, however, there still come under my observation cases where, for some special reason, the external incision seems preferable; in these instances I still use it with great satisfaction. I believe that the chances of introducing infection through this external incision are greater than where the single intranasal incision is used. This last statement may be considered inaccurate by those who regard the nasal cavities as habitually filthy and the abiding place for all kinds of pathogenic bacteria. In fact I was once accused of inaccuracy and my ability to transplant bone successfully through an intranasal incision was questioned, though at the time I had on record a series of some twenty-five cases of successful transplantation by this method. The doubting Thomas, however, in this case was a man whose ideas had been formed from a few experiments on animals and whose personal clinical experience in the transplantation of bone had been far less than his voluminous writings on the subject would indicate.

In intranasal surgery there are two factors in favor of the surgeon the value of which should not be underestimated, namely; the antiseptic properties of the normal nasal secretions and the established local immunity of the tissues to the bacterial flora normally resident in the nasal cavities. Here laboratory experiments may not agree with clinical experience, but it is the latter which interests the practical surgeon and is of paramount importance in his work. The intranasal operation is far more difficult than the external, for in elevating the tissues over the nose, making the notch in the frontal bone and other procedures, and later introducing the transplant and adjusting it in its proper position, the surgeon is obliged to keep clearly in his mind's eye the anatomy of the parts and be guided almost entirely by the sense of touch. In order to do this operation skillfully and successfully one must have the proper instruments and he must be familiar with their dimensions, furthermore he must be able to determine at all times during the operation by the sense of touch their exact position and their relation to the fascial planes and all of the anatomical structures involved.

If the nasal depression is great, the subcutaneous dissection of the tissues must be extended on both sides of the nose for some distance over the cheeks in order to permit of the use of some of this tissue for the building up of the nose. In doing this one must be careful not to injure the lachrymal duct, the angular artery or the infraorbital vessels and nerve; the dissection should be superficial to these. In these cases it is sometimes necessary to use several strips of bone superimposed and it may also be necessary to support the lower end of the transplant by introducing a strut of bone in the lower edge of the septum; one end of this strut rests under the lower end of the transplant and the other end is supported by the nasal spine of the superior maxilla. It is far better, where a considerable amount of bone is needed, to use several strips rather than one of more bulky proportions, for the former are more easily nourished and osteogenesis is favored; furthermore, there is a minimum of absorption in the centre of the transplant which, being furthest removed from the circulation, always suffers more or less from a lack of nutrition; this is shown by a thin line of absorption in the x ray plate in the centre of all transplants that have been placed for six months or longer.

The positive value of the periosteum cannot be denied; the contrast in the vigor of growth between bare and periosteum covered transplants is well shown in a number of x ray plates taken of cases in which both had been used. In removing bone for transplantation, I always preserve the periosteum on the outer surface of the rib.

If infection occurs, a part or all of the transplant will be lost. If we succeed in controlling the infection shortly after it has become manifest, that portion of the bone which has been exposed to the infection will present a dendritic appearance, due to the localized areas of absorption, for every particle of bone that dies will be absorbed, usually in about six weeks. In some instances the bone may be absorbed in its entirety. This does not mean a complete failure of the operation, for the dead tissue is replaced by connective tissue which sometimes corrects the deformity in a perfectly satisfactory manner. Infection, however, in a bone transplantation case, is an accident always to be deeply regretted, for if any portion of the transplant is saved, it means at best a long convalescence. The situation can usually be cleared up at once if the transplant is removed as soon as the infection manifests itself, but we always hesitate to do this if there is any chance whatever of saving it.

I have had remarkably few infections, but I believe that they will occur from time to time in the practice of any man who does much of this work regardless of how careful he may be. It is the accidental introduction of a foreign strain of bacteria that is to be feared, more than those habitually resident in the nasal cavities though none are to be trusted, and rigid asepsis must be the watchword.

The presence of acute infections of any kind is, of course, a positive contraindication to operation, but the question often arises as to whether we should transplant bone in the presence of chronic sinus infections. Of course every effort should be made to cure or at least to control these before operation, but many of the cases which need bone transplantation badly would not be relieved by this operation if we waited until a chronic ethmoiditis was cured. Saddleback noses are likely to be accompanied by ethmoiditis and especially is this so if the deformity is of specific origin. Personally I am inclined to class the virulence of the chronic sinus infections with that of the other habitually present bacteria of the nose, which as we know is low. However this may be, I have, on several occasions, secured good results by transplanting bone where the patient was suffering from both ethmoiditis and atrophic rhinitis. The condition was treated, of course, beforehand, but it was not cured at the time of the operation. It seems to me that there is abundant proof that the tissues of the nose becomes immune to the old chronic infections.

Bone transplantation should never be attempted a short time after any other cutting operation in the nose, for failure is almost certain to result. No attempt should be made to transplant the bone until the first operation is completely healed.

Deformities due to syphilis constitute the most difficult class of cases with which we have to deal, not only on account of the degree of the deformity, but chiefly because we are here dealing with perverted metabolism, and a bone transplant is most sensitive to this. There is always present a large amount of scar tissue, poorly supplied with bloodvessels, which must be removed before we can hope for a bone transplant to survive in such an environment. The general condition, too, of the patient is generally bad. As I have discussed these cases in detail elsewhere, I will only say here that when operation is considered the patient's general health must be good, he must be free from all active manifestations of the disease, he must be Wassermann negative and the rib selected for transplantation must show at least no gross evidence of having been affected by the disease. These cases are tedious and require great patience on the part of both the surgeon and the patient. In properly selected cases the prognosis is good; some of my best results have been secured in the correction of deformities due to syphilis.

In conclusion, I will say that the transplantation of bone and cartilage is the only means yet devised by which the class of nasal deformities under consideration can be permanently corrected. The technic involved in this work is delicate and in order to secure good results it must be carried out with scientific accuracy in all of its details. It is my belief that a failure to master the technic on the part of some who have attempted this work accounts for their failures and for their belief that the bone is absorbed. The fault is with the operator and not with the method.

Bone when properly transplanted is not absorbed, but it continues to live and grow, its growth being regulated by the functional demands of the part.

2 West Sixty-seventh Street.

Resistance to Tuberculosis.—Harry Gauss (*Colorado Medicine*, June, 1922) advances a chemical theory of resistance. It has been observed that three per cent. carbon dioxide causes some inhibition of the growth of the tubercle bacillus in the test tube, and that fifteen per cent. is tuberculocidal. Tubercle bacilli will not grow in carbon dioxide free atmosphere. Cultures of the bacilli buried in the tissues of animals and permitted to acquire the carbon dioxide concentration of the body are inhibited in their growth, while other cultures similarly buried, except that the ingress of air is permitted, show no inhibition. The end products of metabolism of the tubercle bacillus inhibit automatically the growth of the organism that gives rise to them. This study indicates that the concentration of carbon dioxide found to inhibit the growth of the tubercle bacillus occurs normally in the human body, and that this concentration probably does inhibit the growth of the tubercle bacillus, thus establishing this factor as significant in the resistance to tuberculosis.

Abstracts from Current Literature

Treatment of Tuberculous Empyema.—C. A. Hedblom (*Surgery, Gynecology and Obstetrics,* April, 1920) gives the following results of treatment of tuberculous empyema:

1. Primary or idiopathic pleurisy with effusion, in a large proportion of cases, is probably tuberculous in nature.

2. A past history of pleurisy with effusion is common in cases of tuberculous empyema. In many cases the effusion is serous at the onset.

3. Tuberculous pleurisy may be primary, or it may be secondary to a pulmonary, peritoneal, or other tuberculous lesion.

4. The onset of a tuberculous effusion may be insidious or it may be sudden and associated with an acute and severe constitutional reaction. A mixed pleural infection due to the perforation of a tuberculous cavitation often runs an acute and rapidly fatal course.

5. Diagnosis of tuberculous empyema is made by demonstration of the bacilli in the exudate, by animal inoculation, or by examination of the sectioned pleura.

6. A sterile effusion is probably tuberculous. An infected effusion may be tuberculous.

7. Empyema following primary idiopathic pleurisy with effusion, or empyema of insidious onset, especially in the presence of a pulmonary or other tuberculous condition, is probably tuberculous.

8. Empyema may be tuberculous in spite of persistently negative findings over a long period of time.

9. In a closed pleural cavity a sterile effusion, whether serous or purulent, should not be treated by open drainage, except in the presence of an impending perforation of the chest wall.

10. Repeated aspiration of only part of the fluid present is indicated in cases of serous effusion producing definite dyspnea on exertion or symptoms of circulatory embarrassment.

11. The replacing of aspirated fluid by nitrogen or filtered air may be indicated in cases in which there are symptoms of active phthisis referable to the same side as the effusion.

12. A sterile purulent effusion should be treated as though it were serous if the lung expands when fluid is withdrawn. If the lung is fixed in a collapsed condition or if the effusion persistently recurs, an extrapleural plastic operation is indicated.

13. Effusion in a closed cavity showing a mixed infection should be treated by the closed method with antiseptic solution irrigation, or by open drainage; the open drainage is indicated especially in cases of severe infection associated with extensive pulmonary tuberculosis, making irrigation hazardous.

14. Tuberculous empyema with a large bronchial fistula should be drained by the open method.

15. A large tuberculous empyema with mixed infection from a previous drainage operation or from spontaneous perforation of the chest wall requires a plastic operation, preferably after treatment with Dakin's solution.

16. A plastic operation involving closure of a bronchus offers the only prospect of cure.

The Treatment of Brachial Plexus Injuries.—Alfred W. Adson (*Northwest Medicine,* February, 1922) says that injuries of the brachial plexus vary in severity from a slight disturbance to complete paralysis of one or more roots, the result of effusion of blood and synovial fluid, shoulder dislocation, fractures, gunshot and stab wounds, stretching of nerves, laceration, and evulsion of the roots. Treatment depends on the cause and degree of the injury. No one method, either medical or orthopedic, should be used as a panacea for all brachial plexus injuries. Since many of the injuries are slight and a fair degree of recovery takes place following massage and exercise, surgical treatment should not be too hastily instituted, but, when needed, should be used to free up constricted nerves and to bring about an end-to-end anastomosis of the severed fibres. Gunshot and stab wounds of the brachial plexus should be treated like peripheral nerve wounds in other parts of the body. Accompanying dislocations or fractures should not be neglected.

The Larynx in Pulmonary Tuberculosis.—James Crockett (*Clinical Journal,* March 29, 1922) sums up his paper by saying that tuberculosis of the lungs may manifest itself first in the larynx, and that the earliest signs of laryngeal disease are: 1. An anemia of the tissues of the larynx out of all proportion to the general condition of the patient. 2. Limited unilateral areas of hyperemia. 3. Unilateral congestion or edema (simple catarrh is symmetrical). 4. A filling up of the interarytenoid space, causing it to become convex instead of concave. This may become necrotic and ulcerated. 5. Unilateral encroachment of the cord by the ventricular band. 6. Loss of the pearllike whiteness and thickening of the cord. 7. Limitation of the mobility of one cord because of paresis of the muscles of tension or of abduction. The main difficulty is to differentiate tuberculosis from syphilis, and these points are noted: 1. Syphilis affects particularly the anterior surface, tuberculosis the margin of the epiglottis. 2. Syphilitic ulcers of the larynx are punched out and surrounded by a congested area; tuberculous ulcers are shallow and irregular. 3. Syphilis goes deep; tuberculosis goes wide. 4. Syphilis is more common on the anterior part of the larynx, tuberculosis on the posterior part. 5. Potassium iodide removes syphilitic lesions rapidly; it makes tuberculous lesions worse, rendering the parts more edematous. The Wassermann and tuberculin tests should always be resorted to in cases of doubt or difficulty.

Latent Pleural Empyema with Acute Peritoneal Symptoms.—W. Goldschmidt (*Wiener klinische Wochenschrift,* June 1, 1922) reports a rare case, in which a man fifty-nine years old, was admitted to the hospital suffering with marked acute peritoneal symptoms, such as abdominal rigidity, spasmodic compressive breathing, diffuse pain in the abdomen with a tender point to the right of the umbilicus, pulse frequency of 90 and normal temperature and obstinate obstipation, which had been present for several days. The acute onset began three hours before admission. A dullness on the right side of the thorax was disregarded because of the predominance of the abdominal symptoms. At operation, the findings were unconvincing and a perforation (which was the preoperative diagnosis) was not demonstrable; a condition resembling intestinal obstruction from kinking was found at the hepatic flexure and relieved, but the patient died one week later. The necropsy revealed a right sided pleural empyema with abundant thin pus and the thickening of the pleura indicated the existence of an old process. The right lung was completely atalectatic and there was also a bilateral diffuse suppurative bronchitis.

The remarkable feature of this case was the latent course of the empyema up to the time that it produced severe abdominal symptoms. Abdominal rigidity and even shock are known to occur in the pneumonias of children and in the pleuritides and empyemas of children and adults, but the occurrence of a symptomless pleural empyema resulting in the picture of perforative peritonitis is very rare. The abdominal symptoms became manifest before the abdomen was invaded and the reflex symptoms in the abdomen, produced by pleural and intercostal irritation, affected not only the abdominal wall, but also the colon and cecum.

Tuberculous Lesions of the Right and Left Lung.—Stivelman and Miller (*American Journal of the Medical Sciences,* July 1922) conclude from their study of 1,048 cases that in early tuberculosis the right side is affected twice as often as the left, but, as the disease progresses, there is a marked increase in the number of involvements of the left lung, so that, in the advanced stage of the disease, the right and the left lungs are equally involved numerically. Patients, with a predominating left lung involvement, are liable to run an active course more often than those with preponderating right side lesions. In early phthisis, the side of the lung involved has no definite relation to the general prognosis, but, in advanced phthisis, the prognosis is distinctly less favorable in those with preponderating lesions of the left lung. The presence of but one interlobar fissure, moderate atelectasis, and the evil effects of sinistracardia and retraction of the stomach are factors which contribute toward the greater gravity of left lung lesions as compared to the right.

Diaphragm Irregularities.—Ralph C. Matson (*American Journal of the Medical Sciences,* June, 1922) says that the assumption that tenting of diaphragm always diagnosticates pleurodiaphragmatic adhesions is unjustifiable.

Tentings of the diaphragm, frequently seen on plate and screen at the termination of the hilidiaphragm superfices with characteristics, which are associated with pseudoadhesions, are purely physical phenomena brought about by two factors: During inspiration the diminished elasticity or rigidity of the lower bronchial branches prevents descent of that area of the lung base in immediate relationship to the bronchus involved; thus a dimple effect is produced on the surface of the base of the lung. The diaphragm being molded to the base of the lung by a negative intrathoracic pressure is held by suction in the dimple producing a tented appearance.

Diaphragm irregularities of the pseudoadhesion type are commonly found during the course of acute and chronic respiratory infections. In acute respiratory infections with peribronchial infiltration involving the lower bronchial branches, the irregularity disappears with *restitutio ad integrum.* In chronic respiratory infections with consequent connective tissue, proliferative changes in the lower bronchial ramifications, the irregularity appears to be permanent in nature.

It is reasonable to suppose that should infiltrative or proliferative changes incident to infection not halt at a point in the bronchial tree proximal to its termination, but, instead, proceed to the pleura, then the diaphragm would become adherent and pseudoadhesion would be converted into a true adhesion.

Angiolymphe as a Curative Remedy in Tuberculosis.—A. V. Frisch (*Wiener klinische Wochenschrift,* June 15, 1922) reports upon the use of and excellent results from, a remedy consisting of extracts of ixia rosea, morea sinensis and orchis maculata; it contains glucoses and glucosides, but no mineral salts or alkaloids. An ampule contains 0.05 gm. of extract to two c.c. of water. This is injected intramuscularly every day or every second day for one to two weeks; after an interval of one to two weeks, another series of six to twelve injections is given. These injections are borne without reaction even in highly febrile and toxic cases. Most of the cases (twenty) selected for this treatment were those that showed only a slightly favorable prognosis. The production of too severe a general or local reaction need not be feared with this remedy.

While this treatment is not a panacea in hopeless cases, it nevertheless does not aggravate the disease process. Most of the febrile cases showed a gradual defervescence and the toxic symptoms, such as nightsweats and anorexia, soon disappeared; the cough and expectoration were diminished, as was also the number of tubercle bacilli in the sputum. There was a marked increase in weight, associated with a regression of the auscultatory signs and a marked improvement of the subjective symptoms.

Role of the Lymphatics and Lymph Glands in the Absorption of Foreign Articles and Tubercle Bacilli.—P. T. Herring and F. G. MacNaughton (*Lancet,* June 3, 1922) state that the lymphatics form a closed system of vessels lined by endothelium and that the term lymph should be restricted to the fluid within them. The tissue spaces are not directly continuous with the lymph capillaries and the tissue fluids are not necessarily the same as lymph. The lymphatics are especially concerned with the absorption and carriage of solid particles and of material insoluble in water. Soluble matter enters the blood capillaries directly. Fine solid particles are not distributed along the lymphatics, but their spreading results partly from mechanical causes, gravity and muscular contraction, and particularly with the aid of ameboid phagocytosis. Many solid particles eventually reach the lymphatics in the cytoplasm of cells which enter the lymphatics by diapedesis.

The phagocytes are arrested in the first lymph gland they encounter, and passing from the lymph sinuses of the gland into the cortex and medulla of the gland, they discharge their burden among the lymphocytes located there. Solid particles, and even free erythrocytes, are taken up by the endothelial cells of the reticulum of the lymph sinuses which ingest the material, detach themselves, and carry it into the glandular lymphoid tissue in the same way. The lymph gland is an efficient filter and only allows solid particles to pass through it when they are excessive, or when the gland is disorganized. The lymphatics of the lymphoid tissue act as mechanical barriers, preventing the escape of the particles, and finally the barrier is reenforced by fibroblasts and the formation of fibrous tissue. The foreign material is surrounded, while the lymph sinuses are left unobstructed for the passage of lymph.

The tubercle bacillus undergoes the same fate as foreign bodies and are in addition acted upon by a normal physiologic process for the absorption and arrest of the bacilli. In the first lymph gland entered, some of the bacilli are destroyed, while others remain viable and produce a tuberculous focus in the gland. The resulting toxins induce an intense lymphocytosis in the other glands through which the lymph passes and render the glands less pervious to the bacilli by filling the lymph sinuses with lymphocytes. This protection is a mechanical one and the imprisoned organisms remain a source of further infection when the fibrous tissue and the protective barrier break down. These observations support Cohnheim's law that the tubercle bacillus reveals its site of entry in the body by producing characteristic changes in the lymph glands draining the site of entry. There is no evidence of a new formation of lymph glands in tuberculosis. Microscopic glands become enlarged, but much of the tissue associated with tuberculous glands is merely tuberculous tissue with a superficial resemblance to lymph glands.

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Letters to the Editor.

A WORD TO CONSULTANTS.

New York, *December* 1, 1922.

To the Editors:

For many years I have thought what a model consultant the late Dr. Austin Flint, Sr., was. He would say with his genial, considerate manner, "Doctor, tell me about your case." After he heard your story in a room where you and he were alone, he would go into the patient's room with you. He would question and examine the patient as much as he thought necessary or desirable, and would then, with a kindly, helpful word, retire to the adjoining room with you. There he would go over the case with you and say frankly, if he differed with you as to the diagnosis or treatment. He would finally say, "Doctor, subject to your approval, I would suggest that you try later, or now, the use of such a drug or mixture." After leaving the room, one of the family of the patient would ask Dr. Flint what he thought about the patient or what treatment he advised. With a smile he would answer, very pleasantly, "Dr. Robinson is the attending physician. He will tell you and do everything required." With that he would bow and leave the house, with a good day.

Have I known other consultants to act in a similar, commendable manner? I have not. Usually they talk with one or other member of the family and say what they think or feel. Their words are frequently misinterpreted and hence cause trouble in lessening faith in the practitioner.

As a rule, and Dr. Flint knew it, the practitioner knows his patient and family far better than the consultant can know them. Hence, his advice is in reality more valuable. Occasionally the consultant's advice, or his diagnosis, is important and valuable. But this is not invariably true. Far from it. Therefore, the consultant should conduct himself in a fitting manner; namely, with due regard to amenities and to professional ethics, in the best sense. *"Verbum sat sapienti."*

Beverley Robinson, M. D.
129 East Thirty-fifth Street.

PROFESSIONAL SECRECY.

New York, *December* 12, 1922.

To the Editors:

Personally, I am of opinion that all knowledge obtained by the family physician in his professional relations with his patients should be kept inviolate in all cases, when to reveal it in court and to the public in this manner is most reprehensible and should not be permitted by judges, except where criminality affecting the people's welfare is directly affected. Therefore, I am absolutely opposed to physicians stating in court, as to illicit relations between the sexes, as to the existence of venereal or malignant disease, in the case of the patient, of abortion, caused by ignorant or foolish doing. There are also other cases in which the doctor should be absolved from making a statement, or even answering a direct question of the prosecuting lawyer. In cases where criminality is involved, then if the judge decides that the doctor must answer clearly and sufficiently, his moral allegiance to his patient is covered and he is not bound by any sense of professional correct doing, if he responds frankly and completely, so far as he knows.

Beverley Robinson, M. D.
129 East Thirty-fifth Street.

Rochester, Minn., *December* 6, 1922.

To the Editors:

I am endeavoring to make a complete study of the distribution of human actinomycosis in this country. The number of cases reported in the literature is surprisingly small, and I know that the disease is not so rare as is sometimes thought. I shall greatly appreciate hearing directly from any one who has had experience with this disease, and desire to know concerning case histories the following: age, sex, occupation, residence, state in which the disease was contracted, location of lesion, duration of symptoms, and any special points of interest connected with the treatment, outcome of the disease, or necropsy findings.

A. H. Sanford, M. D.
Mayo Clinic.

NEW YORK MEDICAL JOURNAL
and MEDICAL RECORD
Philadelphia Medical Journal and the Medical News
A Semimonthly Review of Medicine and Surgery
GREGORY STRAGNELL, M. D., *Editor*

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NEW YORK, WEDNESDAY, JANUARY 3, 1923

PHILADELPHIA AWARD.

PHILADELPHIA, *December* 13, 1922.

To the Editors:

I enclose copy of a statement of the qualifications of Dr. Sajous for receiving "the Philadelphia Award." This Award is a sum of money to be given each year by a prominent citizen, to a citizen who fulfills certain requirements specified, to the effect that he or she has made the largest contribution to the welfare and good fame of the city. Last year—the first instance of the awarding—it was bestowed upon Leopold Stokowski, leader of the Philadelphia Orchestra. This decision was reached by a committee formed—so far as I know—largely by choice of the donor, Edward Bok.

Such a decision failed to command the enthusiasm of those of us whose complexes react to such broader issues as those of human welfare in the large.

I am offering a copy of this statement to the *Saturday Evening Post,* but have no expectation it will be accepted. In any event I hope the copy submitted to you may be found available and published promptly in order to meet the eyes of physicians and elicit expressions of opinion from them. If this award is not made to Dr. Sajous this year it might be some other year.

MADISON TAYLOR.

A CANDIDATE FOR THE PHILADELPHIA AWARD.

By J. Madison Taylor, A. B., M.D.

Professor of Physical Therapeutics and Dietetics, Medical Department, Temple University, Philadelphia, Pa.

If the purpose which animates the donor of the Philadelphia award is that the recipient shall be one who distinguishes the City as a center of world influence of both humanitarianism and scientific research and power, as well as one who fulfills the local conditions, I would name a man who fulfills all these requirements, but whose position and whose modesty may not seize and hold popular attention, or sentimentalities, nor arouse emotional reactions. That man is Charles Euchariste de Medici Sajous. He has lived here since early manhood, has done a colossal work, quite as much international as local.

His efforts as serving suffering and imperiled human beings have been one uninterrupted continuance of monumental force and success which will be more recognized generations hence, and even now is abundantly recognized by those who have the vision to see the obvious when amply demonstrated and verified.

The nature, character and scope of these achievements cannot be recounted here. They are written large on the tablets of fame; they include the whole field of life saving measures as these are displayed through the arts and sciences of medicine, private and public.

It is true Philadelphia made the discovery long after the world had done so and is only now coming to a realization of facts abundantly established in Europe, Asia, Africa, North and South America, and the Islands of the Sea. Testimony to that effect is readily available by any one whose vision is not restricted or who decides through reason, demonstration, and not emotion.

The local service, distinction or benefit rendered by this one man include—among manifold others—a scientific and practical presentation which compelled attention to the fundamental needs of furnishing solutions to a multitude of obscure problems which had heretofore retarded knowledge.

Whereas human beings subjected to the perils of disease of all sorts, kinds and degrees, had been furnished consisting of a vast accumulation of scientific findings competent to relieve suffering and save life, these findings were so detached, inadequately related, so unsystematic, so lacking in proportionate values and consistency, they often failed to produce such practical results as were well within their powers. There was lacking—before the appearance of the epoch making volumes of *The Internal Secretions* and *The Principles of Medicine* by Sajous in 1903—a centralizing thought or coordinating principle, or system of integration.

This coordination of the inchoate masses of information was furnished by Sajous in his painstaking researches, his judicial observations, his many genuine discoveries—some of new and essential facts—but more of a wide, judicial survey and sifting of testimony from which emerged just that reconciliation and illumination so urgently needed to vitalize and render available and for the practical application of the already existent findings.

Nay more; of course there was opposition, depreciation, misinterpretation, all sorts and kinds of retardation—as invariably follows a burst of explanation on new and unfamiliar lines. A lesser man—like many other heroes and prophets—would have been swept into oblivion, or only have achieved credit and acceptance centuries after his death.

Just here is where Philadelphia should come in. In spite of all the inevitable flood of opposition, so calmly and patiently and serenely did Dr. Sajous work and meet all attacks with perfect preparedness and unimpeachable proofs—long foreseen—and always from the vantage point of Philadelphia, that, in strong contrast to the fully expressed expectation and firm opinions of his friends, he not only justified and proved all his points, but led his opponents to admit him right, to accept his views in a few short years, at least while he is yet alive. His years, however, are now many and any award is more agreeable when one survives to receive it.

This influence generated in, evolved in, and grew to international proportions and advantage for world wide welfare, right here in Philadelphia. Not in one year, of course; no exploit of such cosmic magnitude could evolve in one year. No exploit, no service that any one could achieve in any one or two or fifty years compares with this.

Is Philadelphia, or the commission of the Philadelphia award, to overlook such distinction for Philadelphia—simply because it is so huge as to confuse vision?

New York Medical Journal
and
Medical Record

Philadelphia Medical Journal and the Medical News

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Migratory Tumors of the Abdomen*

By ASA W. COLLINS, M.D., F.A.C.S.,

San Francisco.

The existence of migratory tumors of the abdomen not infrequently receives general mention in articles dealing with other conditions, which appear in periodical literature. Case reports, however, are curiously few, and standard textbooks covering the subject of abdominal tumors are almost uniformly silent concerning socalled aberrant or wandering types of neoplasms. In a work as extensive as that of Hertzler (8) we find nothing more definite than the remark that torsion of the pedicle or thrombosis may occlude the nutrient vessels of a uterine tumor so that "it may acquire a new attachment to an adjacent part, usually the omentum. These new attachments may supply the needed nutriment and the tumor may become entirely separated from the uterus and retain its attachment to its new host." Hertzler calls this process sequestration. Bland-Sutton (1), in connection with torsion of the pedicle of an ovarian or uterine cyst, mentions the possibility of the pedicle breaking so that "the tumor becomes detached from its uterine connections." He also mentions a case where "a dermoid which had undergone axial rotation so lengthened its pedicle that the tumor sometimes rested in the loin and resembled a very movable kidney; it produced no pain but annoyed the patient by its excursions about the belly." He also says that "in a small (uterine) fibroid with a thin pedicle, torsion will sometimes lead to its complete separation; indeed, a small fibroid detached in this way has been seen free in the pelvis. A subserous fibroid the size of a cricket-ball has been found completely detached from the uterus and adherent to the omentum."

Nicholas Senn (11) quotes Virchow, as an authority that it is "questionable" whether pediculated subserous tumors ever become completely detached, but says he himself "is satisfied that such an occurrence is possible, as in making a laparotomy for the removal of multiple myofibromata, he found in the abdominal cavity a detached tumor as large as a small pear."

That migratory tumors occur more frequently than these brief references would lead one uninformed upon the subject to suppose, is abundantly evidenced by a search of the literature. Van Buren Knott (10), reviewing the literature in 1905, gave the earliest reported case as that of West in 1858, who found a fibroid the size of a walnut in Douglas's cul de sac, supported by a "false membrane between the uterus and the rectum." Knott also quotes Roger Williams as mentioning a number of cases reported by different observers before 1880. I have not been able to verify these references.

The earliest case report which I have found is one recorded by William Turner (18), the specimen from which he exhibited to the Obstetrical Society of Edinburgh on December 12, 1860. Autopsy upon his patient revealed that the left ovary had become detached and was present as a large tumor adherent to the depending margin of the omentum, and to "the peritoneum covering the anterior surfaces of the bodies of the last lumbar and first sacral vertebræ." The right ovary and tube were normal, but "a calcareofibroid tumor about the size of a walnut" was attached to the uterus by a pedicle; "a roundish tumor about the size of a hazelnut" lay on the floor of the rectovaginal pouch, which was of calcareofibroid structure and "quite loose, having no connection whatever to the adjacent parts"; while "a third tumor of the same character, and of the size of a pea, was embedded in adhesions on the floor of the rectovaginal fossa." The author ventures the opinion that "it is probable that these tumors had at one time been connected to the uterine walls, and that they afforded examples of detached subperitoneal fibrous growths."

The famous obstetrician, Sir James Young Simpson (14), writing in 1871, mentions that he has several times seen detached tumors in the abdomen but gives no details. F. S. Porter (12) showed a specimen of a fibroid found unattached in the abdomen, to the Dublin Obstetrical Society in December, 1875. He "had not heard or read of any similar case."

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*Read before the State Medical Society of California.

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J. Knowsley Thornton (17), an English surgeon, on April 2, 1881, removed from a patient who had been under his personal observation for nine years, a dermoid tumor which he found adherent to the omentum on the right side. This turned out to be the left ovary which appeared to have been detached and wandered to the right side. This hypothesis was confirmed by earlier notes made on the same patient, as he had palpated a small tumor on the left side many years before, and on examination one year prior to operation had found that the tumor was enlarged and moved over to the right side.

Malins (11) reports five cases "where cysts were transplanted to a new situation; in one the separation was not absolutely complete when the patient was operated upon, though the transplantation was advanced; in the three others the union from the place of original development was entirely severed, and a connection established under different auspices with fresh structures." Malins further remarks that "the process by which this (migration) was accomplished created much disturbance for a time, but the cysts afterwards appear to have settled down with a singular accommodation on the part of their surroundings."

In Heywood Smith's (15) case, a tumor about the size of an orange was found on the right side, adherent to the omentum and the oviduct, when freed from these the tumor "came away without a pedicle." No appendages were found on the left side but the right ovary and oviduct were found to be deep down in the pelvis on the right. The writer considers this migration of the ovary containing the dermoid cyst to be unique, but Halban (7), thirty-two years later, reported one very similar to it.

I. S. Stone (16) had two cases of "wandering, parasitic or aberrant retroperitoneal uterine fibromata" where the neoplasms had "succeeded in getting away from the uterus and even the broad ligament" escaping into the space below the peritoneum and there supporting an independent existence "remote from their former bed in the organ from which they sprung." The trend of the discussion which followed the presentation of Stone's paper would seem to indicate that most of his audience did not believe in the possibility of migratory tumors; one hearer saying frankly that he "should think cases such as reported by Dr. Stone are very, very rare."

The description of Croom's three cases is very interesting. In the first one "a tumor the size of a small cocoanut was found occupying the pouch of Douglas. On opening the abdomen and passing my hand into the pouch of Douglas, the tumor slipped up into the abdomen. It was quite free of any adhesions, and I was able to lift it out entire without securing or ligaturing anything whatever. I found no trace of any pedicle, and there was no hemorrhage whatever." In the second case "the tumor was adherent to the anterior wall, and on being separated and removed entire, it was found that the pedicle was not only twisted and very small, but had given way close to the neoplasm. Evidently this separation had taken place some time previous to operation, because the pedicle was dry and firm, and there was no indication of hemorrhage."

The third case Croom designates as a "curiosity." On opening the abdomen and "exposing and tapping the tumor, one slight adhesion to the abdominal wall was secured with catgut, and thereafter the tumor was simply pulled out of the abdomen, there being no further adhesion, and no apparent attachment to any pelvic or abdominal organ. The tumor was not ovarian because both the ovaries were intact. It is remarkable that a tumor of such size should have maintained an independent existence in the abdominal cavity with only a slight adhesion to the abdominal wall."

The first attempt at a review of the literature I find in Van Buren Knott's (10) paper published in 1905. From personal communications he collected two cases each from J. Whitridge Williams, F. H. Martin and J. M. Baldy. Those of Williams and Martin were myomata which had formed vascular connections with other structures before breaking away from the uterus, but in both of Baldy's cases a small detached tumor was found perfectly free among the intestines. Knott also reported two personal cases of fibromyomata unattached to the uterus, but obtaining nourishment by adhesions to the peritoneum and mesocolon.

A brief review of German cases of migratory ovarian tumor was recently published by Kayser (9) who also reports a case similar to those mentioned in the earlier literature.

Of Goullioud's (6) two cases, the first was an ovarian cyst which had become detached from its original site and at operation was found firmly adherent to the anterior surface of the uterus; the second was a uterine fibroid which was completely severed from its point of origin and was "isolated in the peritoneal cavity." The uterus was almost obliterated by another huge fibroid which was firmly adherent.

In the cases heretofore noted the patients were all women, the tumors having their origin in either the uterus or ovary. A case unique in many respects is described by Campbell and Ower (3) whose patient was a man aged sixty-nine. For a period of twenty-five years this man had been conscious of a mass in the right side of the abdomen, at first smaller than a hen's egg. It was originally noticed in the right hypochondrium, but was freely movable and would sometimes disappear into the pelvis for several days at a time. During the last six years it had increased in size, but was not tender and was dull on percussion. The patient came under observation because of a cystitis with retention due to hypertrophy of the prostate, and was so anxious that something be done for the abdominal condition that although the state of his kidneys rendered him a poor operative risk, laparotomy was undertaken. On cutting through the peritoneum the tumor showed a pearly white glistening surface, exactly comparable to a uterine fibroid. It had absolutely no pedicle nor any attachment whatever. It bore no apparent relation to any viscus, nor was there an adhesion of any kind attached to it. Indeed, on searching the abdomen there did not seem to be any adhesions present. On section the mass cut with some difficulty and seemed to have a calcareous centre around which the tissue was a little less hard than that of the remaining portion. No vessels, cells, nuclei, or fibrils could be demonstrated in the tissue. Although "the wound remained normal" and "the patient did well for the next seven or eight days," he and his tumor appear to have been intimately associated for so long, as to be unable to withstand the shock of separation. At any rate, the patient died on the forty-eighth day, and at autopsy a small subperitoneal calcareous nodule was found in a fibrous adhesion between the transverse colon and the under surface of the left side of the diaphragm, and a similar mass, white and calcified with a smooth surface under glistening peritoneum, was found in the small bowel about six inches above the ileocecal valve. The author's hypothesis is that the aberrant tumor had its origin in a similar calcareous mass which had new layers added to it from the surrounding envelope of peritoneum.

It will be noted that in none of the cases of migratory abdominal tumors which have been reported is there any mention of previous operation, or of the possibility of this peculiar type of neoplasm appearing as a graft from some earlier growth removed from the same patient. That such migration and reimplantation may occur, however, seems in every way probable. Last fall Brewer (2), of New York, reported a typical fibromyoma of the abdominal wall which developed ten years after hysterectomy, the uterus having been the seat of multiple growths of the same character. Brewer is of the opinion that this fibromyomata "arose from the implantation in the line of incision, of a minute fragment of the uterine tumor removed ten years before," because of the following circumstances: "First, the coincidence of the development of this tumor in an individual who had previously harbored an exactly similar growth in a neighboring structure; second, that in its removal the tumor bearing organ with its divided and exposed tissues had been for some time in actual physical contact with the divided and exposed tissues of the abdominal wall, in the exact location in which the secondary growth subsequently developed; third, the wellknown and generally recognized fact that certain cutaneous and mucous membrane tumors which are in close or frequent contact with neighboring tissues, not infrequently give rise to similar growths in the tissue thus exposed; fourth, that modern experimental surgery has furnished innumerable examples of successful grafts of tumor tissue as well as normal glandular structures, in both animals and man; and fifth, that surgical literature records not a few examples of both benign and malignant tumors arising in the immediate neighborhood of incisions previously made for the removal of histologically similar growths; as well as tumors developing from the accidental implantation of aberrant fragments of normal tissues or cells into a new and histologically different environment."

Concrete examples of such implantation are mentioned by Cullen (5) in writing concerning adenomyomas, and it seems reasonable to believe that other neoplastic forms might originate in the same way.

In considering this subject it is necessary to differentiate between migration and metastasis. By migratory, aberrant or wandering tumors, are meant those which originally arising in connection with some organ, nearly always the ovary or uterus, by some combination of circumstances become detached from their primary implantation. This ordinarily occurs only after the growth has formed adhesions with some other structure than the one in connection with which it originally arose, but not infrequently these masses have been found free in the abdominal cavity with no apparent source of nourishment.

The power of metastasis, on the other hand, is possessed only by those tumors which are of the infiltrating type, their component cells being able to pass out into the interstices of the connective tissue like the roots of a plant into the soil. Thus, cells growing from the periphery of malignant tumors invade the surrounding connective tissue spaces, or escape to greater distances—as into the lymph vessels and glands—where they proliferate, or they may even invade the blood stream and thus be carried to remote parts of the body (8).

Aberrant tumors must, therefore, be of what Hertzler terms the *expansile* type, that is, possessing the power of autonomous growth, but not of invading the surrounding tissue. They can, however, displace the tissue, and in this way form a socalled capsule which encloses them and from which they can be readily shelled out.

The infiltrating type forms no capsule, the cells extending from the mother tumor into the surrounding tissue, which with its contained vessels and nerve becomes a part of the tumor or is destroyed. Senn (13) says that the recurrence of a benign tumor is always local, and is invariably the result of incomplete removal of the tumor.

The exact cause of migration is rather obscure. The most common explanation, as we have seen in reviewing the literature, is that the pedicle of a neoplasm, usually a cyst or fibroid, is severed because of torsion or other cause of destruction, and, the neoplasm having previously formed adhesions with other structures than the one upon which it originated, continues an independent existence. This hypothesis does not, however, cover such cases as those of Baldy or the one described by Campbell and Ower. A tendency to isolation seems to be almost a law of the growth of uterine fibroids. If they are found within the uterine wall, the surrounding tissues often lie in such a way as to give an appearance of encapsulation; if they lie outside the uterine cavity they show a marked disposition to project into the abdominal cavity, developing a pedicle, and often becoming entirely detached. In the same way a fibroid, or a cyst upon the peritoneal surface, will project into the pelvic cavity, forming pedicles in the same manner as the intrauterine variety, and may later be severed from their original point of contact, either with or without having previously formed attachments to surrounding organs.

Should an encysted ovary, or a uterine leiomyoma contract adhesions with the surrounding parts, separation is, of course, much more likely to take place especially if it becomes attached to the bladder or colon, or any organ constantly undergoing changes in size and position, as the alternate contraction and expansion would, of course, exercise traction upon the pedicle of the tumor, so that it would stretch, and eventually give way altogether. Pregnancy might very well have the same effect, and if the tumor attained a large size, its own weight might add to the tension upon the original attachment.

All the clinical manifestations which have been evidenced by aberrant tumors of the abdomen may arise from the presence of ecchinococcus cysts, but hydatid disease is so rare on this continent that the chance of such cysts being found is very slight indeed, though the possibility of its occurrence should be borne in mind in all cases of obscure tumors among foreigners, especially those from Iceland, Australia, or southern and eastern Europe.

It is manifestly difficult, if not impossible, to make a positive preoperative diagnosis of a migratory tumor of any description. The existence of uterine fibroids, or of an encysted ovary, may well excite suspicion of such a possibility, but a more exact diagnosis than that of Thornton, almost forty years ago, is not likely to be made until a laparotomy has enabled the surgeon to recognize the true state of affairs.

Case I.—Mrs. E. C., married, aged forty-four, admitted March 4, 1917, mother of two children, youngest twenty years of age, has complained for past year of hemorrhages from the vagina at irregular intervals and pain in the abdomen. Examination (bimanual) showed a mass of irregular shape about the size of a large grape fruit occupying the region of the uterus. Operation March 6, 1917, hysteromyomectomy. The uterus contained many tumors of various sizes. Examination of specimen showed it had a semicystic consistency and on being incised the whole of the fundus of the uterus is found infiltrated by a soft mass which infiltrated the body of the uterus. This area measured one and a half inches in diameter. This area was very soft and differentiated itself from the surrounding tissue by being yellowish-reddish gray while the surrounding muscular tissue was grayish white. The mucosa was velvety, slightly irregular and markedly congested.

Microscopic examination of the section showed it to consist of numerous spindle shaped cells arranged in concentric layers, containing a small amount of interstitial connective tissue and a large number of thin walled blood vessels. The stroma was increased in areas but the tumor for the greatest part consisted of cells which did not stain with the Fuchsin or the Van Gieson Stain, indicating their myomatous origin. A diagnosis of leiomyoma of the uterus was made.

On April 14, 1921, the patient arrived from Seattle where she had been under the care of Dr. C. S. Leege for the past six months.

She had lost fifteen pounds in the past six months and complained of pain in the abdomen at various times in the day and night. The pain was described as gas pains and migratory, but usually began in the left hypochondrium and passed to the right and downward toward the cecum. She had difficulty in getting the bowels to move, requiring enemas to move them. The patient felt a tumor mass about a month previously.

The x ray examination (enema) showed the last third of the transverse colon to be adherent on the outside to a tumor in the general region of the lower pole of the kidney. The tumor being about the size of a doughnut, not painful. Movement of the tumor caused movement of the bowels. There seems to be a slight stricture of the bowel at this point. The stomach filled well, was very spastic and showed no signs of a tumor. A diagnosis of tumor of the transverse colon was made.

At operation on April 16, 1921, a left rectus incision fifteen cm. long was made. The omentum was found to be adherent to the old scar and the stump of the uterus. The adhesion to the anterior abdominal wall was very firm. The mass could be brought up through the incision and was found to be located on the transverse colon near the splenic flexure and was forming a part of the anterior wall, and covered with peritoneum and omentum. The vessels on the surface of the tumor were normal in size. The colon was dark red and firm in consistency. There were no adhesions to the tumor. Posteriorly to the tumor the colon was distinctly visible and uniform in size, the mass evidently not interfering with the lumen except from pressure from without. Stomach, liver, both kidneys and gallbladder were normal in size, shape and position. The pelvis was clear except normal right ovary. The colon throughout was small in calibre. No enlarged lymph glands were found.

The tumor was removed with about one and a half inches of colon on either side of the mass and a lateral anastomosis of the mesial end with the sigmoid as the mesiocolon at the splenic flexure was too short to bring it over. The wound was closed without drainage. Microscopical examination showed leiomyoma. Patient made an uneventful recovery.

Case II.—Mrs. F. H. Admitted January 4, 1922, complaining of three palpable masses in the lower portion of the abdomen in and adjoining the line of incision of an operation performed two years previously for the removal of an abdominal tumor. Examination showed three round and movable tumors about the size of small oranges in the hypogastrium. They were attached to the anterior abdominal wall. Bimanual examination showed a movable round mass in the abdominal cavity occupying the region of the left ovary about the size of a large orange. The previous operation consisted of the removal of a papillary cystadenoma of the right ovary.

Five encapsulated tumors were removed from the anterior abdominal wall and the cyst of the left ovary. Microscopical examination of all the tumors showed papillary cystadenoma. It was found that at the first operation the tumor was broken up in its removal and portions of it became scattered in the abdomen as well as in the incision.

COMMENT.

A tumor of the abdomen may acquire a new attachment to some adjacent organ, when its pedicle becomes twisted, and continue to grow in a new locality, supplied by blood from the new pedicle, or a piece of a benign tumor may migrate in the abdominal cavity and become attached to any organ and begin a new growth by transplantation.

From a diagnostic viewpoint the only possibility of making a preoperative diagnosis would be in a case where a careful history showed a preexisting tumor having changed location and with symptoms suggesting a history of strangulated pedicle, or the presence of a tumor in the upper abdomen with or without symptoms following the removal of a myoma or cystoma.

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126 Post Street.

Iodine and Iodotherapy Based on a New Iodine Preparation

By HARRY J. NOVACK, M.D.,
Philadelphia

Although iodine was discovered in 1812 by Cortois, it was not until 1819 that it was first employed as a medicine by Coindet, Sr., of Geneva, and has since become one of the most important therapeutic agents.

The therapeutic results and phenomena herein recorded are based upon the use during a period of six years of two preparations of iodine of my own modification, one containing iodine alone and the other iodine and bromine. Though they are not true colloids of these elements, they are colloidal forms truly compatible with the human body and have named them colodine and colobromidine. True colloidal iodine—that produced by electrolysis in which microscopic particles consisting of clumps of iodine molecules are liberated and held in suspension in an aqueous medium—is of no greater value in the body than an alcoholic or aqueous solution of iodine; all are precipitated and converted into iodides prior to absorption into the blood. Besides, a true colloidal iodine is unstable, remaining so only a very short time after preparation, reverting into a plain solution of iodine and hydriadic acid.

Colodine is prepared from pure resublimed iodine by an electrochemical process whereby the iodine vapors during sublimation are fed through an oily medium until combination is effected. The result is neither an absorption product nor a solution but a chemical combination, in which the iodine is held strongly enough to withstand decomposition by the digestive fluids and bases, yet loosely enough readily to give up its total iodine content where most needed after absorption. It is a coal black, neutral, oily liquid, slightly heavier than water, specific gravity 1.0059 at 17° C. (62.6° F.), faint oily odor and slight metallic taste, containing ten per cent. iodine in chemical combination. It is insoluble in alcohol or water, but entirely soluble in all proportions of ether, chloroform, carbon disulphide, vegetable and mineral oils and fats.

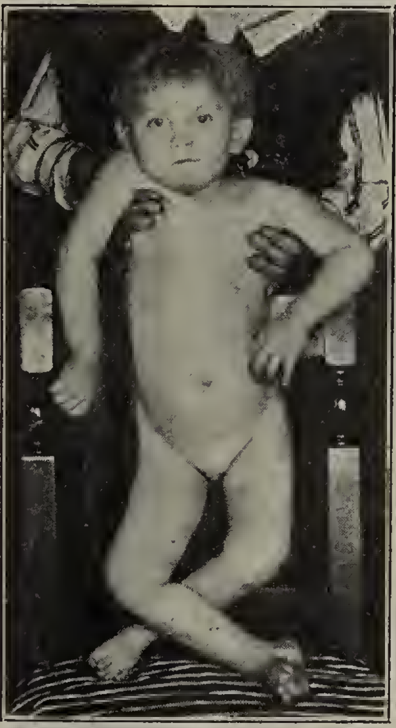

Fig. 1.—One of the patients (M) upon whom the new preparation was employed.

Colobromidine is prepared from colodine by the addition of elementary bromine vapor until combination is effected. It is physically similar to colodine except more viscid and heavier, specific gravity 1.0909 at 17° C. (62.6° F.) and contains ten per cent. iodine and twenty per cent. bromine in chemical combination. No potassium or sodium iodide or other material is used as an aid or intermediate in either preparation. Colobromidine is used where the sedative action of pure bromine is desired in addition to that of the iodine and since its administration is similar in every way to that of colodine, the term colodine will be used as synonymous for both preparations.

In vitro, colodine is but feebly antiseptic, registers the presence of free iodine but slightly, and is apparently an inert product. Ehrlich, however, showed that the efficiency of any given substance need not necessarily be the same in vitro as in vivo. On the contrary, some of our most active chemotherapeutic agents, such as arsenobenzol, only develop their full effect in the living organism, while they are practically inert in the test tube. He also furnished the important proof that a substance can only exert a therapeutic effect if it is held by, and linked up with, the cells that are to be acted on, i. e., in the case of infectious diseases, the pathological microorganisms in question.

Colodine is apparently nontoxic, as I have given in some cases a daily dose of one ounce without any untoward symptom. This is due, first, to its being bland and nonirritating to the stomach; second, its very gradual absorption and deposition in the tissues; third, its very rapid elimination.

Being a fat, colodine passes through the stomach unchanged into the intestines, where, during the course of digestion, only a very trivial part is converted into salts by the bases present in the alkaline fluids. The bulk, however, is absorbed like all fats directly into the circulation, aided by the action of the leucocytes, carried to every part of the body, where the iodine content is gradually liberated to combine with the bases, byproducts and lipoids present in the blood and tissues. A part is deposited in the tissues as fat, from which the iodine radicle is also gradually and continuously given up, resulting in deeper iodine therapy. Continued colodine administration depletes the body of most free and easily dissociated bases, resulting in purer iodine medication. It can be detected in the urine, sweat, tears, or saliva by adding a portion of starch or starch water and a little nitric acid to free the iodine from its salt compounds, when the characteristic blue color will appear.

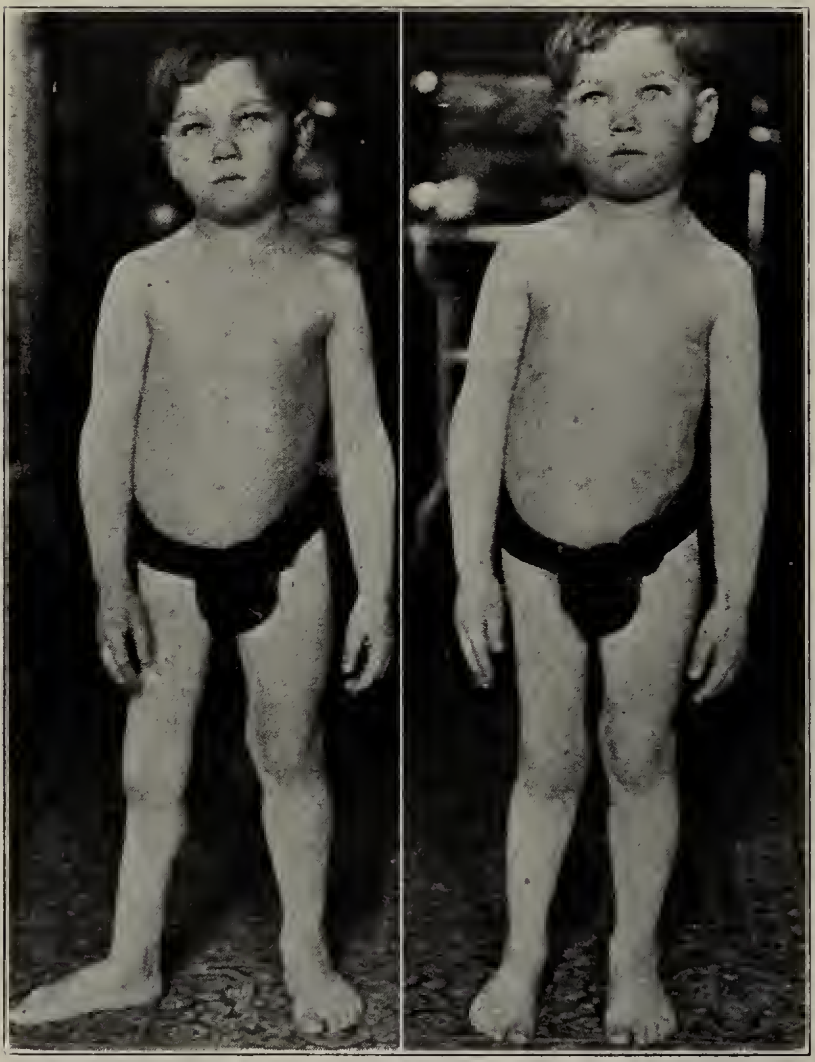
FIG. 2. FIG. 3.
FIG. 2.—One of the cases (J. R.) where the new preparation was used.
FIG. 3.—The same patient at a later date.

Not only does iodine sensitize infectious bacteria—which are colloids and lipoids suspended in a soft medium containing different salts—but also enhances the germicidal efficiency of the phagocytes themselves. This action of iodine is intensified to the greatest degree by colodine since the phagocytes play an important rôle in its absorption from the intestines where they come directly in contact with it.

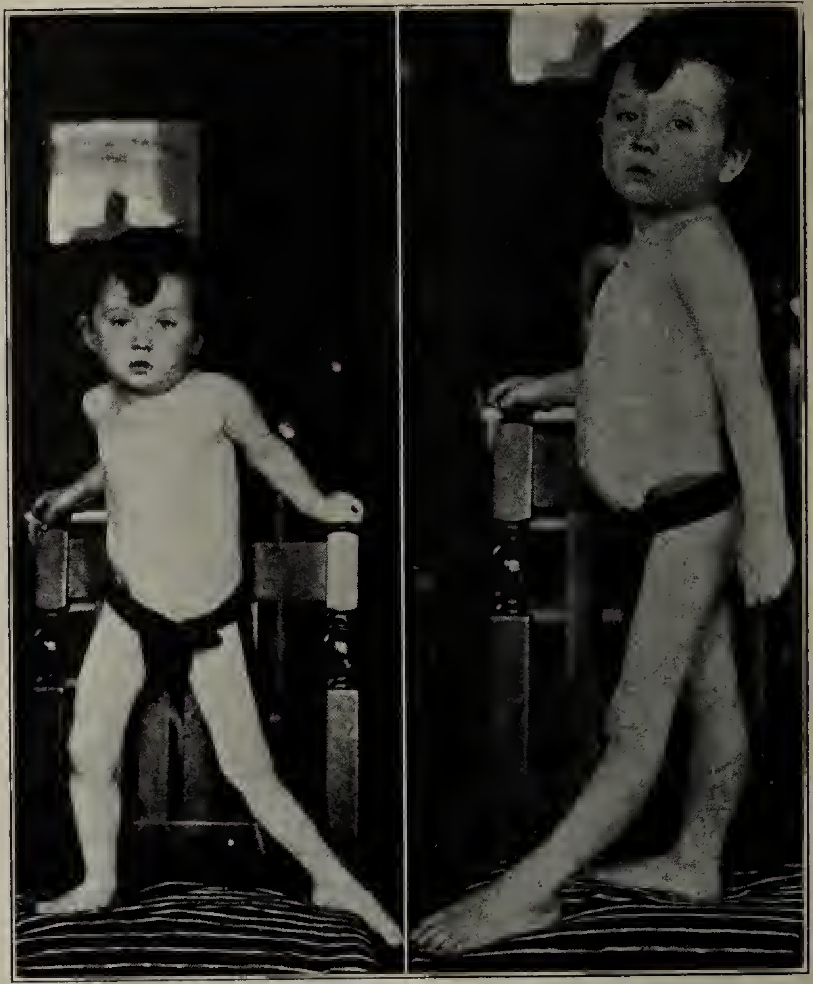
FIG. 4. FIG. 5.
FIG. 4.—Case I., J. H., showing condition before administration of treatment.
FIG. 5.—Another view of the patient in Fig. 4.

Another important action of iodine that is rarely considered is its influence upon the viscosity of the blood which it lowers. Since in most acute and chronic inflammations of bacterial or other origin there is present a coagulation process with engorgement of the surrounding capillaries, a decrease in viscosity of the blood is an important and desirable action and renders the possibility of fresh blood

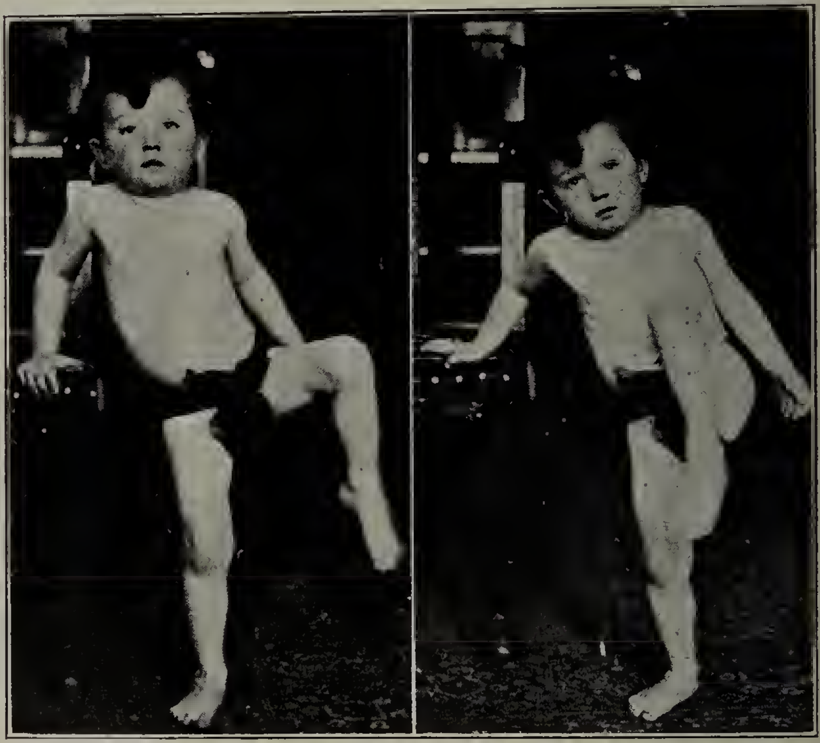
FIG. 6. FIG. 7.
FIG. 6.—Showing condition of patient (Case I.) after administration of treatment.
FIG. 7.—Movement of patient after treatment (Case I.).

reaching the sites where most needed in order to carry on successful phagocytosis and cure. Then again, in arteriosclerosis, atheroma and senility, blood of a lowered viscosity will flow through capillaries that it would otherwise block and obliterate.

In the normal individual, free from past or hidden present infection, the action of colodine in average doses of ninety minims daily, is that of mild general stimulation. Urine, saliva, respiratory and cardiac action are slightly increased. Continued medication gives a sense of wellbeing by gently stimulating metabolism in general and an increased feeling of warmth due to the increased amount of blood reaching the surface of the body. Never so-called iodism, only in some cases a metallic bitterish taste in the mouth which disappears in due time, or is gotten accustomed to and not noticed. Leucocytosis is so slight as to be barely noticeable. No appreciable rise in blood pressure which no doubt would occur as the result of the slight cardiac stimulation, were it not balanced or neutralized by the lowered viscosity of the blood and dilation of the capillaries. Appetite is stimulated and, together with the increased metabolism, a gain in weight results.

In the average individual the action of colodine differs according to the condition of the system. At first there is that same sense of well being and mild stimulation as in the absolutely normal individual, gradually followed within an indefinite time —a few days to a few months—by an exacerbation or awakening of symptoms referable to a present, recent or past infection. It is in these individuals that increased leucocytosis results, varying in degree with the nature and number of infectious bacteria liberated by the colodine. The increased leucocytosis brought forth by iodine is therefore only secondary to its primary action or that of releasing the infectious material hidden and held in abeyance in some part of the body like the tonsils, nasal mucosa, sinuses, skin, glandular system, lungs, joints or any other tissues affected.

Briefly, the cardinal points with reference to the action of colodine are: First, antimicrobic. a. It bares the infectious bacteria by stripping chemically and otherwise the natural protective material or wall which the body in its defense has thrown around them. b. It sensitizes and weakens the bacteria, as previously mentioned but to a greater degree than do the salts of iodine. c. The leucocytes already stimulated by the colodine and finding the former imperfect defense weakened or eaten away and activation of the germ nest beginning, are forced to fight, producing the typical colodine reaction at site of infection, typical of any acute infection but with the balance usually in favor of the phagocytes and the body. Second, the lowered viscosity of the blood and dilatation of the superficial as well as deep capillaries, increasing metabolism, and aiding the first or antimicrobic action. Third, general eliminative action of excess bases, insoluble calcium, metabolic byproducts as well as mercury, arsenic and lead. Fourth, general endocrine glandular stimulant and activator, equivalent, if not superior to that produced by glandular therapy.

INDICATIONS.

Iodine medication has usually been associated with the treatment of subacute and chronic affections and only recently has it come forth as being of value in acute diseases.

The indications mentioned below are based on the results of years of study in a large number of varied cases and involves the use of over 250,000 adult doses of thirty minims of colodine representing a total of over one hundred pounds of crystalline iodine.

Generally, colodine has been used with unusually good and often miraculous results in the following conditions: Acute and chronic tonsillar infections; acute, subacute, and chronic rheumatic affections of the joints, muscles and nerves; endocarditis and valvular diseases of the heart; acute, subacute and chronic glandular infections and swellings; simple and exophthalmic goitre resulting from focal infection; catarrhal pneumonia; bronchial asthma; hay fever, acute and chronic bronchitis and pleurisy; acute and chronic laryngitis and spasmodic croup; just before and following crises in lobar pneumonia; acute and chronic gonorrheal infection of any part of the urogenital tract; gonorrheal rheumatism; primary, secondary and tertiary syphilis; scarlet fever; atheroma and arteriosclerosis; high blood pressure, especially that resulting from focal infection or sodium chloride irritation or syphilis; paralysis following an apopletic stroke as well as that resulting from acute anterior poliomyelitis; senility; as an emmenagogue and endocrine glandular stimulant; abscesses, boils, carbuncles, erysipelas, cellulitis and various eczematous skin affections.

In acute tonsillitis, especially where the streptococcic strains of bacteria are predominant, colodine is specific. After ten or twelve hours of intensive medication, thirty or forty-five minims every two hours, despite the fact that the reaction causes increased swelling of tonsils, peritonsillar tissues, and in some cases tenderness of the muscles and glands of the neck, pain, discomfort and temperature are much lessened. Given early its action is abortive in one or two doses. In most cases within twenty-four hours a typical crisis occurs with perspiration and rapid fall in temperature. Continuation of average medication, thirty minims three or four times daily, insures rapid recovery and safeguards the heart and joints from involvement.

In acute articular rheumatism, particularly that resulting from focal infection, colodine is specific. Reaction and cure are affected in a comparatively short time despite the fact that the original site or focus is not removed. The joints last involved are the first to react and swellings may often increase to such a point where one is tempted to incise in order to drain, but this should never be done as gradual recession automatically takes place. Some passive and active movements of the affected joints should be carried out daily to prevent fixation. The heart, if not already involved, is rarely infected after the body is saturated with colodine. When the endocardium is involved, the good effects of the medication are such that when acute symptoms recede it is left with a minimum or no permanent damage. Colodine in this condition is much superior to the salicylates which have the distinct disadvantage of producing marked proteinuria and casts when given in large doses, and have often wondered if they have not the special ability of weakening the endocardium thereby rendering it more susceptible to involvement. After the joints are normal, foci of infection should be removed.

In chronic arthritis colodine causes a more prolonged but attenuated reaction and gradual clearing of the joints. It can be used over a long period of time. Foci of infection should be removed when possible and in intractable cases treatment may be aided with physiotherapy, vaccines or other means desired.

In acute or subacute gonorrheal rheumatism when used fairly early colodine is specific, producing a decided reaction and recession to normal similar to that in the streptoccal joint infections. When uretheral infection is still present, the flow of pus is usually increased. Fixation of joint or joints is not advisable, instead, passive and moderate active motion to prevent ankylosis. Cases apparently crippled return to normal within three to six weeks under colodine medication.

In acute gonorrheal urethritis it has proven to be the best internal remedy for the system. There is an immediate fixation or limitation of parts already infected as evidenced by the characteristic reaction produced, i. e., increased swelling of penis, testicles or glands in the groin, with increased discharge, gradually followed by recession and a thin discharge requiring only a simple astringent to complete the result. Medication should be continued for a time after all symptoms are cleared. Some patients starting treatment after a period of selfmedication and neglect, may complain of pain in one or more joints when colodine is given, showing that the infection was on the threshold of producing an arthritis. This subsides rapidly even before the cure of the uretheral infection. No special diet was given in any case nor was liquor forbidden in individuals accustomed to it. Cures have been proved by the microscopic examination of urine, prostatic and seminal secretions and complement fixation test, and some patients are still kept under occasional observation. The average time required is from one to three months or a little longer when there is a history of previous attacks, but there is that satisfaction of feeling that the genital organs are left in an absolutely normal condition and not with a hidden germ nest in the glands or other tissues for future activation.

Chronic gonorrheal urethritis with a history of many acute exacerbations over a prolonged period responds to the clearing action of colodine more so than to any other known treatment, not excepting vaccines. Within a short time after starting medication a discharge appears, or if already present is increased, with but slight reaction and tender points over the urethra or other parts involved. The discharge may cease or lessen and then start or increase again. This may occur several times during a period of three or four months, giving one the impression that multiple hidden nests of pus were reached and emptied. Finally all discharge ceases. An astringent should be used during the last month or two but this does not influence the attacks of discharge produced by colodine. The average time of treatment in the most chronic case was five months, with complete cessation of discharge during the last month.

In boils and carbuncles, even those occurring on the upper and lower lips, the antimicrobic power of colodine is noticeable, causing rapid expulsion of the core or cores with hastened resolution and healing. A small opening, if not already there, should be made but not large enough to disturb the natural protective wall in any direction. Continued medication prevents the formation of additional infective sites by raising the resistance of the individual. When desired, vaccines, heat, and local applications may be used as aids. In abscesses the action is similar, but when resolution results they must always be opened in much less than the usual time with rapid dissolution of the hardened base and a minimum of scar tissue.

In scarlet fever colodine is superior to any known medication, protecting the heart, preventing complications, and shortening the duration of the disease. Desquamation usually begins on the third or fourth day instead of the eighth or ninth and ends much sooner. In severe cases with hyperpyrexia, ulceration of tonsils and uvula and swelling of the neck, large doses should be used; in a child five or seven years of age forty-five minims every two hours for ten doses, then thirty minims every three hours, or three or four times daily till complete recovery.

In broncho pneumonia its action is very decided, checking the progress and clearing the lungs in days instead of weeks as is usually the case. Its action is not so brilliant in the lobar types of pneumonia but is of great service in hastening resolution, preventing complications and shortening convalescence.

In amenorrhoea colodine is a very potent drug. By thinning the blood, dilating the capillaries and stimulating the thyroid, pituitary, as well as the other endocrine glands, it will often cause to continue for months the menstrual cycle even in those cases on the menopause borderline. It should therefore not be used in the early days of pregnancy as it will in the majority of cases cause separation of the feebly attached impregnated ovum.

In the paralysis resulting from acute anterior poliomyelitis the results with colodine are worthy of note. The first action is that of increased warmth in the paralyzed limbs followed in a comparatively short time by the regain of muscle function and increase in muscular power generally. In a child of five or six years of age thirty minims three times daily (the adult dose) are given. Within two or three months a reaction rendering patient inactive, indisposed and lazylike, calls for a cessation of medication for a week. It can now be resumed in full doses until similar reaction occurs or else half the dose may be given and continued indefinitely. Its mode of action in these cases is as yet not clear unless it increases the nerve force carrying power of the uninjured nerve fibres, or else saturation of the body with the drug may render the muscles more sensitive to feeble impulses. That iodine has the power to enter the spinal cord is well known and possibly in that way clearing away the débris relieves the uninjured nerve elements from pressure. It is not meant that muscles completely atrophied will be rejuvenated, but, as will be seen in cases reported herein, almost completely atrophied muscles have regained their action in as comparatively as short a time as in the more recent cases. Shortened tendons and contractures must be surgically corrected, but minor deformities due to overactivity of one set of muscles and paralysis of the opposite set should not be interfered with surgically, but mechanically and manually exercised and corrected until the paralyzed side becomes rejuvenated by the medication, thus aiding in the correction of the deformity. In the acute stage of this disease I have not had experience.

ANTERIOR POLIOMYELITES.

Case I.—John H., three years eight months old, referred on January 6, 1922. His mother, twenty-three years old, and father, twenty-four years old, were both living and well. Birth was normal and he had been breast fed. His present illness began on October 10, 1921; after slight fever he suddenly found that he couldn't walk. Both legs were paralyzed and after being confined to bed a month right leg became almost all well. Physical examination showed tonsils, negative; heart, negative; pulse 112; right leg normal; left leg all muscles paralyzed except a little life in the iliacus and psoas magus, so that he could flex thigh on abdomen, raising foot one inch from ground and rotate slightly outward. All other muscles dealing with movement of thigh, leg, foot or toes in any direction were completely inactive. The entire left leg from groin to toes was several degrees colder than right leg and somewhat discolored with bluish mottled spots. The left leg was atrophied and about one third less thick than right. He threw his left leg and foot outward when walking or standing and the knee was thrown backward giving the leg the shape of a bow with the convexity in the back.

Treatment: colodine, in thirty drops floated on a teaspoonful of water, was given three times daily. Thermopenetration with pads six by eight inches over spine and abdomen, 1000 ma. for ten minutes interruptedly. Sinusoidal and vibratory ten minutes each. At first treatments were given triweekly then reduced to once weekly. The treatment was begun on January 6, 1922. On January 10, 1922, the leg became warmer from groin to knee; January 13, 1922, raised thigh to fullest limit flexing it on abdomen, warmth extending to middle third of leg; January 16, 1922, could flex all toes of left foot except large toe; January 20, 1922, could flex leg on thigh feebly but not extend; January 23, 1922, could extend leg feebly when in lying position and on smooth surface; January 30, 1922, flexion and extension of leg much increased and strengthened; March 13, 1922, slight motion in ankle appearing; March 22, 1922, all muscles involved were hypersensitive and tender, particularly the soleus and peronei. The skin was also hypersensitive. Child felt lazylike and the drug and treatment were discontinued for a week until reaction abated. Thus far, station was perfect. Walking showed slight limp due to lack of power in ankle. The child did not throw his leg as previously, but stepped forward naturally and until reaction came he would romp around all day without getting tired or fall. I am confident that with very little additional treatment full muscle power will be regained in the ankle which is all that is now lacking. On April 20, 1922, he could flex, extend, abduct and adduct ankle with a light weight placed on plantar side of foot.

Case II.—Frieda M., two years eight months old, referred on January 15, 1922. Family history was negative. Past history showed that she had had measles. Present illness began with infantile paralysis on July 12, 1920, when she was in the hospital for three weeks. The right leg became paralyzed first, then the right arm and left leg. Physical examination showed that she wore braces, but could not walk, stand, or even sit erect of her own accord. Right leg and hand felt cold. Left leg had all degrees of motion, i. e., adduction, abduction, rotation, flexion, extension, but was very sluggish and weakened. There was diminished sensibility in all parts affected. Right arm hung lifeless at side of chest, atrophied to one half the thickness of the left hand; humerus was out of the glenoid fossa and head could be felt on top as well as on the sides; the hand was only slightly affected. The right leg was completely paralyzed and without the least motion obtainable in any direction. Muscles of back were partly paralyzed so that sitting was difficult without some support.

Treatment.—Braces were discarded. Colodine in thirty drop doses was given three times daily. Thermopenetration over spine, also monopolar vacuum electrode over surface, sinusoidal and vibratory as in former case, first twice, then once weekly. On January 17, 1922, the right leg became warmer and the patient could lift thigh in flexion one-quarter inch. On January 21, 1922, while in dorsal position, she moved right thigh outward six inches, inwards two inches, and flexed thigh upwards so that knee was raised eight inches. On January 28, 1922, she could extend right leg slightly. On February 8, 1922, she could extend right leg with force and very slightly flex it. February 14, 1922, flexion and extension of leg was definite and increased. On March 1, 1922, she could sit erect without aid, turn over on her back or abdomen with her own effort and flex both legs to the full limit while on her back. Right arm was much developed in thickness, and she could adduct, abduct, rotate arm and flex and extend forearm feebly. Right ankle and toes were still lifeless. Right arm had been almost completely drawn up into socket. On March 1, 1922, she was languid, lazylike and indisposed, therefore medication and treatment were discontinued until reaction passed. March 8, 1922, she had power to rotate right thigh and showed increased strength in all muscles. March 29, 1922, she was able to raise herself from dorsal position without aid.

Case III.—Charles C., aged four years six months, was referred on January 9, 1922. He became ill with infantile paralysis in August, 1918, when fourteen months old, and was ill for two weeks with fever and not well for three weeks afterwards. It was noticed that both legs were paralyzed. Physical examination showed that he wore ankle brace on left leg and a brace past the knee on the right leg. There was a scar of an operation over the right hip which corrected outward deformity and apparent elongation of leg. Right leg was atrophied to about half the size of left leg in thickness. Left foot turned outward and was not corrected by brace which he wore. Could not stand without support.

Treatment.—Braces were removed and manual turning of left ankle inward ordered, forcibly flexing and extending it so as to stretch the tendoachilles which was partly contracted. Colodine was given in doses of thirty drops three times daily. One electrical treatment weekly similar to former case. On January 23, 1922, he could flex and extend right leg feebly when on the abdomen. January 31, 1922, could flex and extend left ankle and turn it inward slightly. February 21, 1922, right ankle showed slight extension movement. March 14, 1922, left ankle was much straightened by the activity of the muscles drawing foot inwards. April 4, 1922, had definite motion in right ankle of flexion and extension, also increased power of flexing and extending right leg and could stand erect unaided and walk a little when held by the hand. Treatment was continued.

ADMINISTRATION.

Being a heavy oil, colodine is best administered in 00 hard gelatine capsules filled to a concave meniscus and sealed dry. Such capsule will hold fifteen minims or twenty drops of colodine, two of which are an average dose. In chronic conditions thirty minims three times daily is an average dose. In acute conditions or where rapid saturation is required, thirty minims every two hours may be given for several days when necessary. In children of four to eight years, average dose is twenty drops or fifteen minims three times daily in chronic conditions and may, however, be doubled when required as they seem to tolerate more iodine than adults. It is best given floated on a little water in a teaspoon or mixed with mineral or olive oil. In acute conditions twenty to forty drops every two hours is easily tolerated. For infants, ten drops three times daily in subacute or chronic conditions and ten drops every three hours in acute diseases.

In all painful conditions the addition of the bromine has proven of great value as a sedative. In urethritis colobromidine lessens the tenesmus and chordee. In arthritis it lessens the pain somewhat and gives better sleep. The dose and administration of colobromidine is identical with that of colodine.

It will readily be appreciated that a drug of such low toxicity and high and unusual therapeutic powers should lend itself to a wide range of application in the treatment of disease. In reality, the action of colodine is dependent upon its ability to stimulate the natural forces of the body in its fight against disease, to a point beyond which they usually cease to operate and are content to keep in abeyance within the body the infective organisma.

3147 Diamond Street.

A Biochemical Explanation of the Iodine Molecule

By P. R. VESSIE, M.D.,

Gowanda, N. Y.

Fats are digested by lipase, a pancreatic ferment. This neutral fat is converted principally into fatty acids and glycerin. The fatty acids are rendered by the alkalies into soap, a water soluble fat. The soap is readily absorbed by the intestinal epithelial cells (1) and transported into the circulation. It is then resplit into fatty acids and these molecules anchor themselves to components of the tissue-cell, such as lecithin (2). The fatty acid molecule (3) serves the function of liberating energy. Since the carbon atoms constitute, with hydrogen and oxygen, the organic acid molecule, their explosion is produced by oxygen. But the amount of oxygen in the fat molecule is insufficient to oxidize its carbon and hydrogen atoms, the transportation of additional oxygen being necessary to effect an explosion of this molecule. A complex iodine, which circulates freely in the circulation, is apparently responsible for the direct introduction of oxygen.

A large list of fresh foods contains iodine (4). During proteid digestion it is presumed that traces of iodine, like other food chemicals, combine with amino acids to form iodoamino acid and in this common process it ultimately associates itself with the nucleoproteins of the body (5). Specialized cells in the thyroid gland apply a remarkable power of selection and absorb this amino acid to prepare a synthetic iodine derivative, "thyroxin" (6). Studies in metabolic rate (7) demonstrate the tremendous activity of a minute quantity of thyroxin in the process of speeding up the elimination of cell waste by oxidation; and, as this chemical element can remain in the living organism and decarbonize cells for days (8), without deterioration, it must be regarded as a true catalyst (9). It is quite probable that thyroxin brings the essential oxygen in immediate contact with the carbon of the cell. Carbon dioxide, resulting from oxidation of the organic acid molecule, acts as a stimulant to the respiratory centre. The function of iodine may be summarized by the following steps:

1. Absorption of iodine-bearing food.
2. Formation of iodoamino acid.
3. Reconstructed iodine, thyroxin.
4. Thyroxin as an oxygen carrier.
5. Oxidation of the fatty acid molecule.
6. Formation of intermediate products (10).
7. Carbon dioxide, the final end product.
8. Stimulation of the respiratory centre by carbon dioxide.

When there is evidence of simple thyroidism or defective nutrition resulting from suboxidation, thyroid substance, thyroxin, or small quantities of iodine have their activating effects on the thyroid gland and the tissue cells. But where there is some gross pathological lesion, such as a necrotic lesion or glandular enlargement, a more definite explanation of the therapeutic action of iodine is necessary. The leucocytes carry the molecules of fat to the local site of inflammation to retard the increased combustion of tissues. In this attempt the lesion becomes overstocked with lipoidal (11) substance and the consequence of this excess is an impairment of local oxidation. By systematically saturating fractions of the fatty acids with iodine (12), resolution of lipoidal substance occurs. The chemical alteration of these fatty acid radicals in the lesion alienates this type of fat, exerts a reducing effect, and liquefaction is the result. Thyroxin, the oxygen carrier, then has access to the individual cells and eliminates their carbon waste, accelerating the oxidation of abnormal fibrous tissue and the replacement of normal cellular arrangement.

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Immobility of the Diaphragm, With Report of Cases of Bilateral Immobility

By JOHN H. PRYOR, M. D.,
Buffalo, N. Y.,
Chief Consultant, J. N. Adam Memorial Hospital, Perrysburg, N. Y.

A previous communication, based upon a clinical research in eighty-four patients who had suffered from pleurisy with effusion or empyema, was published in 1916. The mobility of the diaphragm was determined by the use of the fluoroscope, and the opinion that the damaging effects of pleurisy and empyema were far more frequent and serious than had been assumed, was justified. Since that time, opportunity has been afforded to examine others and collect the whole number in a series of 145 cases. The interval between the time of aspiration or evacuation and examination of all cases was about a year and a half. No cases were included except those in which fluid was withdrawn and they may be classified in five groups:

1. Empyema in the child.
2. Empyema in the adult.
3. Pleurisy with effusion.
4. Pleurisy with effusion, and clinical pulmonary tuberculosis.
5. Pneumothorax and effusion.

In the complete series, the conclusion may be drawn that one individual of six escapes with the action of the diaphragm unimpaired. About the same proportion had more or less restricted, comparative motion and in two-thirds of the aggregate all motion on one side was lost. An extended, statistical analysis and tabulation, showing the effect upon the dome, and cardiac and costal sulci will be found in the previous article, and any further discussion of the statistical data will be limited at this time to general conclusions.

EMPYEMA IN THE CHILD.

In empyema affecting the child, fixation of the diaphragm is much more infrequent than in the adult. The tendency to more rapid recovery is apparent and the resultant damage less, with the exception of involvement of the pericardial pleura, and the displacement of the heart. I have reported a number of cases where the position of the heart was changed to an extreme degree and followed by apparent recovery from empyema with a hopelessly incompetent heart. Many times prolonged duration of empyema in the child with irreparable injury to the diaphragm and the heart, have come under observation and are explained to a large extent by incomplete evacuation, undetected pockets, the tendency to allow a premature closure of the opening for drainage and delayed or insufficient attention to the expansion of the collapsed lung. Experience has led to the conviction that the claims made for the benefit derived from the employment of Dakin's solution have been much exaggerated, so far as empyema in the child is concerned. Immobility of the one leaflet followed empyema in the child in about fifty per cent. of those observed. The fact must be emphasized that resultant loss of function of the diaphragm may not be demonstrable for a varying period after recovery. The leaflet may be mobile, or restricted in action for months and upon later examination show complete loss of motion. It should also be remembered that the unnecessary removal of sections of ribs in the child leads to contraction of the chest wall and mechanical restriction of the full length of the leaflet.

EMPYEMA IN THE ADULT.

In the adult empyema is a far more serious disease, and the probability of the crippling of a leaflet of the diaphragm on the affected side is decidedly increased. Of fifty patients observed from three months to eight years after recovery only eight revealed no evidence of loss of motion, flattening of the dome or obliteration of the cardiac or costal sulcus. Why the small percentage escaped is inexplicable, as several of them were severe, intractable cases. One patient who escaped without injury to the diaphragm had a recurrent empyema eight years after the first attack, on the same side, and the case was reported because of its rarity. Accumulated experience during the last six years has strengthened the opinion that consequent adhesion to the pericardium and malposition, with occasional surprising twisting of the heart, form a very important factor in the results and explains symptoms and complaints often overlooked or ascribed to other causes. We find that a cardiac murmur, distinctly audible while fluid is present, disappears quickly after evacuation and also that heart sounds which were normal before an attack later displayed many manifestations of disturbed action, if an exercise test is employed. Pericarditis occurs much more frequently as a complication of empyema and pleurisy than is commonly supposed. There can be little doubt that a purulent pericarditis is one of the associated, grave conditions in fatal cases, and it is practically impossible to detect its presence until disclosed at autopsy.

PLEURISY WITH EFFUSION.

When the results of pleurisy with effusion are compared with those after empyema they are found to be more encouraging. Loss of function of the affected leaflet does not occur in such large proportion. In about half of those observed some motion of the diaphragm is maintained, but only about twenty per cent. show full motion with preserved contour of the dome. Thus about eighty per cent. of the group revealed loss of motion or varying degrees of restriction, loss of the curve of the dome or obliteration of the cardiac and costal sulci. It is in these cases that adhesions and contraction play a larger rôle, and in the past led to the misleading assumption that fixation by adhesions was entirely responsible for immobility. Undoubtedly exudate and residue in the sulci are responsible for the fibrinous deposits which later become organized and interfere with function, but these factors do not account for the changes which take place in the diaphragm. We have frequently demonstrated the fact observed in 1915, that it is impossible to remove all the fluid in the pleural cavity by aspiration. Some of the exudate always remains in the costal sulcus and more accumulates before recovery. The amount of fluid present and the elected time for aspirations seem to make slight difference, if any, so far as the effect upon the diaphragm is concerned. In fact, a dry pleurisy may as effectively produce immobility. The amount of fluid may be small and aspiration considered unnecessary, as in many patients when pulmonary tuberculosis is associated. When aspiration is performed the results are approximately the same as in pleurisy with effusion and no clinical evidence of pulmonary tuberculosis.

PLEURISY WITH EFFUSION AND PULMONARY TUBERCULOSIS.

In this group mention is made only in a statistical compilation of those cases which revealed unilateral immobility. Much assistance was rendered by the physicians at the Adam Hospital at Perrysburg. The results differ very slightly from those of pleurisy with effusion. About half the number were followed by complete immobility of one leaflet and only about twenty-five per cent. had full, normal motion with no apparent involvement of the dome and the sulci. It is in this class of cases that we may look for bilateral immobility, as will be shown later.

PNEUMOTHORAX.

Brief reference is made to pneumothorax as a cause of marked immobility. If the pneumothorax is accompanied by a pleuritic effusion, the ultimate effects are similar and require no special mention. The frequency of pleurisy, provoked by artificial pneumothorax, is thoroughly recognized and reported by conscientious observers, but the remote danger of crippling the diaphragm seems to be disregarded. There can be no definite assurance that a pleurisy may not develop at any time in the other side, and bilateral immobility, with all its disastrous results, may supervene.

EFFECT UPON THE LUNG AND HEART.

Nor can we assume that a pleurisy followed by an impaired or disabled leaflet of the diaphragm will be limited to the side attacked. More than half of those examined during deep inspiration and expiration, exhibited less than normal motion, with changed configuration of the dome on the opposite side. When half of the diaphragm was fixed and the pericardium displaced and adherent, the other half was found, in a number of cases, much restricted and the dome absent. The claim, sometimes made that compensatory activity of the leaflet on the unaffected side would assume a wider scope in its rise and fall, was not realized. In only one instance was an increase of movement displayed by a remarkable excursion, and that was associated with atelectasis. Sufficient proof, supplied by clinical observation, justifies the contention which should be more widely accepted, that pleurisy with effusion and empyema must be considered as a diseased condition in which changes in the diaphragm and pericardium are always involved to a greater or lesser extent. But the question will be asked, Do the effects give rise to any impairment of health, and definite complaints? The answer must be, Remarkably little disturbance in the majority of cases. There are notable exceptions, however, and forms of invalidism may follow for an indefinite time, such as neuralgia, confined to the previously affected side, inability to perform an equal amount of work, palpitation, rapid heart action, and some disturbance in breathing when previous exercise is undertaken. In the course of time these symptoms are likely to disappear, unless adhesions to the pericardium with malposition and interference with the proper action of the heart become permanent. Of course the grave danger exists in the realization that in a very small proportion disease of the opposite leaflet of the diaphragm may develop and bilateral incompetence ensue.

BILATERAL IMMOBILITY.

From a clinical viewpoint the chief purpose at this time is to invite attention to the rare and serious condition of bilateral immobility. A persistent endeavor to detect those thus afflicted has been rewarded. In 1916 I reported one case, and to the best of my knowledge, after a careful scrutiny of the literature, it is the only one recorded. That other observers may have recognized its existence since the introduction of the fluoroscope, is probable, but if published, it has escaped notice. During the last six years, five more have been discovered. One may be briefly described and removed from the group, as it was not due to disease of the pleura and diaphragm alone, but was associated with other complications which contributed in an unknown degree to the complete fixation of the diaphragm. A physician, who had reached an advanced age and gave a history of having had pneumonia during middle life, met with a severe accident. Four or five ribs were fractured, followed by spitting of blood and a prolonged attack of pneumonia of a low grade. Later, much difficulty in breathing was experienced, and he came to me for relief from this distress. Dyspnea followed the slightest exertion and gradually became so severe that he could take only a few steps without a violent attack. The examination revealed complete bilateral immobility—a bovine heart—aortic insufficiency and a large aneurysm. Death followed soon after. The other five patients are included in a series, for clinical study. Each of them had fibroid pthisis of a chronic type in a stage of arrest. Each recollected an attack of pleurisy with effusion on one side, and one had undergone aspiration. In three cases the disease had pursued its usual course for a period of about one year, and then shortness of breath steadily increasing in severity was noticed. They were all sent to me for relief from this dominant complaint. Loss of appetite and weight were slowly progressive. All were anemic, and complained of weakness and inability to perform any work or take the slightest exercise without great discomfort. Any increase from a slow walk for a short distance was followed by distressing dyspnea. The afternoon temperature was subnormal. There was no cough and no expectoration. The blood pressure and pulse pressure were low. Upon examination, the heart sounds were weak and difficult to detect. The impact of the apex was absent and the cardiac area decidedly diminished in extent. The breathing was distinctly costal, and after any effort accessory muscles were summoned to assist in the arduous struggle for breath. After a short period of complete rest, the difficulty in breathing would subside. Palpitation and an increase in the rapidity of the heart action was observed in all. In only one instance could the vital capacity of the lungs be procured, as a proper instrument had not been acquired at that time. The test by the Sanborn apparatus revealed only twenty-three per cent. of the normal standard. It was difficult to obtain an accurate registration, as deep inspiration and expiration were a hard task. Fluoroscopic examination revealed complete bilateral immobility of the diaphragm. Both leaflets were in the lowest position—flat—and the picture was that of an inverted V, with the pericardial attachment forming the apex. The cardiac and costal sulci had lost their normal appearance, and the lungs, descended to their lowest level, displayed aeration to their deepest extent. The depression of the diaphragm was similar to that which appears with a fatal pneumothorax. But the greatest surprise was occasioned by the position of the heart and its contour. Its appearance was like that of a tube with its normal shape entirely lost. The whole structure filled a space about the size of the aorta and resembled the usual shadow of the mediastinum in the region of the aorta, until the location of the pericardial attachment was reached and there it spread somewhat like a fan, at that juncture. No pulsation was visible. The pericardium appeared to have been pulled down and stretched, until the heart, deprived of its normal space by pressure and elongation, had been forced to assume a shape never previously perceived, and to the best of my knowledge undescribed. The appearance is distinctly not that of the drop heart, atrophic heart of advanced tuberculosis, the drop heart, or the asthenic heart, which have long been recognzed by German authors. It was impossible to obtain a röntgenogram of the chest, except in one patient. The mediastinal shadow portrayed in the plate is distinctly wider than that observed in the remainder that were fluoroscoped. The three patients mentioned did not live in Buffalo, and there was no opportunity for a second examination. It was learned later that they all steadily declined. The distressing symptoms increased until death occurred. One died in three months, one in seven months, and one lingered for two years after observation. The immediate cause of death remains unknown.

ARTIFICIAL PNEUMOTHORAX AND BILATERAL IMMOBILITY.

In two patients in the series of five bilateral immobility developed after treatment by artificial pneumothorax. Both were sent to me by physicians in neighboring cities, with the request that the pleural cavity be refilled with air on a definite date. In one, artificial pneumothorax had been employed as a remedial measure, and in the other it had been produced and maintained to prevent hemorrhage. This patient gave a history of repeated attacks of hemoptysis, and the artificial pneumothorax had apparently checked them. No hemorrhage had occurred for three months. Both had been treated by repeated refills, at short intervals. One had a definite history of pleurisy with effusion, on the unmolested side. The other stated that she had had an attack of pleurisy in the past, but in neither case had fluid been aspirated. Both had suffered from chronic tuberculosis, but the disease was in a stage of arrest, and no evidence of activity could be found. In both patients the afternoon temperature was subnormal. They were well nourished, and had not noticed shortness of breath until recently, when inability to exercise and to perform the usual daily duties had become impossible. Of course the invitation to repeat an artificial pneumothorax was declined. Upon examination it was found that the injected air had not been absorbed. The apex beat was displaced, and there was evidence of slight tuberculous involvement, in a quiescent stage, in the opposite lung. Fluoroscopic exposure revealed the lung compressed against the mediastinum, both leaflets of the diaphragm immobile, in low position, and a tubular heart which had not entirely lost its contour. One patient was never seen again, but later information was supplied that she died about eight months later. The other patient was prevailed upon to allow the removal of redundant air from the pleura. The procedure was slow, with periods of rest. After about four hundred c. c. were withdrawn, she was suddenly seized with violent coughing and expectorated large quantities of fluid for about ten minutes. The attempt to avoid an attack of bronchorrhea failed. Later much relief was experienced, and the following day the respirations, which were 35 before interference, had dropped to 22. Later decided expansion of the lung took place, but dyspnea on exertion continued. After a period of one month, another fluoroscopic examination was made, and stereoscopic x ray plates obtained. Complete bilateral immobility persisted. There was no recurrency of hemorrhage. She gradually declined, lost weight, and rapidly became an invalid, unable to walk any distance about her home, or do any work requiring the slightest exertion. The tuberculosis of the lungs remained quiescent. A physician advised her to try a change of climate, and she left the city. No information as to the outcome has been received. Such disastrous results, after the improper employment of a procedure, always fraught with some elements of danger, should cause the enthusiasts to reflect and stimulate caution. One half of the diaphragm had undoubtedly been disabled, long before the other was seriously involved. The significant facts in the history to be emphasized are, that pronounced dyspnea ensued after the last refill, and the expected absorption of air did not occur in accordance with prearranged dates. My experience with artificially induced pneumothorax is comparatively slight. Patients are sent away, and intrusted to the care of conservative confrères if possible. Even when caution is urged, queer things occur in strange places, and perhaps if a thorough search were made, unreported cases similar to those reported might be recognized. In a large proportion of individuals pleurisy with effusion develops, a dry pleurisy with progressively increasing adhesions, or an empyema, sometimes alluded to as benign, after the introduction of air or gases into the pleural cavity. One should know to a certainty whether one leaflet of the diaphragm is incompetent before daring to undergo the risk of irreparably damaging the remaining portion, so necessary for the maintenance of life.

PHRENOCARDIAC INCOMPETENCE A DISTINCT CLINICAL ENTITY.

Any discussion of consequent disability, following complete destruction of the function of the diaphragm, caused by inflammatory action, must include at least two factor, viz., phrenic and cardiac incompetence. Complete fixation of the diaphragm and the physiological and pathological sequence, associated with abolition of function, will not alone account for the symptomatology. The distressing invalidism, succinctly portrayed, is unquestionably due, in a large degree, to respiratory and circulatory failure combined. The author ventures the claim, that a hitherto undescribed clinical entity, characterized by a definite and distinctive symptom complex, should be recognized and accepted, if further investigation by others substantiates the conclusion. Respiratory incapacity is one result of total diaphragmatic inefficiency, but the diaphragm has at least seven functions, more or less interdependent, and these rarely, if ever considered, help to explain the various manifestations of disordered metabolism which contribute the manifold evidence of functional debility. There is justification for the assertion, offered after reflection, that no other morbid condition is revealed through the presence of an identical or quite similar group of clinical data. Gradual immobility of the diaphragm with consequent lack of respiratory ability, associated with cardiac enfeeblement, which is apparently largely due to mechanical causes, are the agencies in the production of a condition which may be described as phrenocardiac incompetence. A suggested, tentative name assists in riveting attention upon the dual relation delineated in the clinical picture. Any resemblance to the array of symptoms cannot be recalled. They have not been seen in the course of long experience in any disease of the lungs, nor can they be ascribed to tuberculosis in any form, if unattended by involvement of the diaphragm or a tragic attack of pneumothorax. None of the patients mentioned had advanced tuberculosis or symptoms of air hunger, when the complaint of breathlessness arose. Furthermore, a careful search has failed to disclose any reference to the appearance of the heart as described. The pulling down and stretching of the pericardium is extreme and the change in the form of the heart, not previously perceived, with the mechanical interference and resultant interstitial changes in the pericardial sac and myocardium, seem to constitute a new type of cardiac disease worthy of recognition and further study. Given a patient with a rare and distinctive picture of dyspnea, cardiac area markedly diminished, apex beat difficult or impossible to discern, heart sounds very faint, remarkably low blood pressure and vital capacity, anemia, gradual loss of flesh and strength, costal breathing, absence of Litten's sign, a history of pleurisy, one sided or double pulmonary tuberculosis, particularly of the fibroid variety, and sometimes a record of treatment by artificial pneumothorax, one should look for x ray proof for a phrenocardiac syndrome and a hitherto hidden but enticing field for clinical and pathological research will be discovered.

CAUSES OF DIAPHRAGMATIC IMMOBILITY.

A diversity of opinion seems to prevail as to the cause of diaphragmatic immobility. It has been ascribed to paralysis of the phrenic nerve and the nerve endings in the diaphragm, to pressure of fluid in the pleural cavity, to adhesions which crippled the motion of that organ, and inflammation of the diaphragm, leading to degenerative changes and fibrotic thickening with loss of resiliency. Pathologists have added surprisingly little to our knowledge. Diseases of the diaphragm are usually dismissed with a few lines which have slight or no bearing upon puzzling problems in morbid anatomy. Only in very exceptional instances is the diaphragm examined with anything approaching thoroughness at autopsy. It has probably been more neglected than any other organ, which offers a new avenue for investigation. Owing to an inability to find opportunity for post-mortem study, it seemed that the only way to secure progress and promote research was by experiments on animals. A plan of procedure was outlined, based upon the following tentative deductions: Paralysis of the phrenic nerve, as a cause, was regarded as unwarranted from a physiological viewpoint. How the phrenic nerve escapes injury is difficult to explain in extreme cases of cardiac displacement, twisting and dense, binding adhesions to the pericardium. But it does, and the diaphragm did not in any instance assume the high position of paralysis. Weight of fluid induces a temporary disablement of a leaflet, but mobility may be resumed to a full or limited extent after the removal of downward pressure by aspiration or absorption. The amount of fluid and the length of time pressure is maintained, are not the chief etiological factors, as some have affirmed, and the diaphragm may remain mobile after pleurisy with effusion, of long duration, and frequent withdrawals of exudate. Adhesions contribute to fixity, especially in the region of the sulci, and contract the space in which the diaphragm moves along the inner and outer points of attachment, but they do not fully account for the complete destruction of all motion, particularly in the bilateral type where the sulci are plainly visible and increased in depth. Furthermore, if the lip of the base of the lung becomes attached to the diaphragm, it would not interfere with the rise and fall of the leaflet unless disease of the diaphragm was also present. The opinion was advanced, that morbid changes in the diaphragm offered the most probable solution and that adhesions would be found to be a contributory agency. The purpose of the research was to learn, if possible, first, the chief causative factor; second, if pleurisy in the animal would supply evidence to uphold conclusions based upon clinical observation; third, if experimental investigation should prove successful, to find methods of treatment more satisfactory than those now employed and essentially preventative in character. At the present time a preliminary report is presented, with the assurance that investigation will be continued.

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26 LINWOOD AVENUE.

The Rhinological Surgeon's Position in Diseases of the Maxillary Sinus and the Relation of the Antra to Affections of the Other Sinuses*

By HAROLD M. HAYS, M.D., F.A.C.S.,
New York

In the numerous papers which I have read before dental societies in the past, I have brought forward persistently the necessity of a closer relationship between the rhinological surgeon and the oral surgeon. When I speak of the oral surgeon, I include also the dentist of today, who has to make diagnoses of surgical conditions of the jaw. I tried to make plain to you that there are various definite relationships between diseases of the nose and throat and the teeth which made it often absolutely necessary that a diagnosis be made of a condition in a part foreign to the specialization in which a man generally works. It is also most difficult, unless the rhinologist progresses with the times, to be able to appreciate that there are lesions within the nose, for example, which are due directly to some oral condition; *per contra,* it is also difficult for the oral surgeon to appreciate that there are nasal conditions which may cause a great deal of trouble with the jaws or teeth. As an example of the former I may cite a recent case of a man, an old patient, who had come to me because of a nasal obstruction on the left side. This man had had a deviated septum corrected by me years before, with an excellent result and had had no trouble for five years, when he again had a nasal obstruction for which I could not account. Thorough investigation, which included the x ray examination, showed a cyst in the upper jaw which eventually proved to have eroded both the maxillary antrum and the floor of the nose, raising the mucous membrane of the nose so much that it was almost impossible for the man to breathe through that side. I referred the patient to an excellent oral surgeon who operated upon the cyst, with the result that his nasal obstruction entirely disappeared. So also the oral surgeon or the dentist will come in contact with patients, children particularly, who are suffering from various forms of nasal obstruction which he, perhaps, thinks are due to malformation of the jaw, principally a high arched palate. More thorough examination by the dentist will reveal the fact that the child has tonsils and adenoids or an enlarged inferior turbinate which is causing all the trouble. If he is aware of such pathological conditions, it is his duty, not only as a dentist, but as a man who is supposed to be alive to these conditions, to see that the patient is referred to the proper person for a more thorough investigation.

I feel that dentistry has arrived at the stage at last where it should be a part of medicine and, no doubt, as time goes on and more thorough researches are made, it will be necessary for any man practising dentistry to have an M. D. after his name so that he will be considered a specialist in a medical art rather than practising an art which is considered by many as foreign to medicine.

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GENERAL ANATOMICAL CONSIDERATIONS OF THE ANTRA.

The antra are so situated that ordinarily they should give little trouble, as far as drainage is concerned, provided the normal opening is patent. It is a remarkable fact that Nature has arranged this drainage into the nose in such a way that it acts by syphonage. The opening of the antra, high up in the nose, in the region of the middle turbinate bone, necessitates the creation of a certain amount of suction in the nasal chambers before it is possible for any of the secretions from the antra to be evacuated. This opening is extremely small so it is no wonder that it becomes so easily closed off when there is an inflammation in the nose. The wall of the antrum is composed of heavy bone except at its lower portion, internally, where it forms the outer wall of the inferior meatus. In this position, the bone is extremely thin and may easily be punctured by a trocar so that it may readily be washed out. This thin wall has no particular physiological significance, but is of peculiar interest to the rhinologist who, so often, has to puncture the antrum and wash it out either with a trocar and cannula, or through a Lichtwitz needle. Of a great deal of importance is the location of the floor of the antrum. The floor may be on a level with the floor of the nose, but in the majority of cases it is decidedly lower. In other words, there is a concavity in the lowermost portion of the antrum, so that a certain amount of fluid may lie below the floor of the nose when any pathological condition in the antrum exists. This floor is made up of the maxillary bone inferiorly and comes in close contact with the teeth and as you are all aware, often some of the roots of the teeth penetrate through the antral wall and actually enter the antrum cavity itself. The lining mucosa of the antrum is also of importance. Usually it is made up of a fine thin membrane which is extremely sensitive, particularly in the region of the infraorbital nerve. This mucosa may very readily become affected or infected when any lesion in the nose itself occurs. Such inflammatory reactions in the mucosa may result in a thickening of the mucous membrane, to the extent that actual polypoid formation of the mucous membrane take place, without having any outside lesion to account for it. For example, an affection either of the maxillary bone such as a necrosis or a decay of the teeth may be present, secondarily affecting the antrum. I am so aware of the important part that an inflammatory condition of the mucous membrane of the nose plays, that frequently I do not feel that I am in a position to make a diagnosis of an acute antral condition, with the formation of fluid, because my transillumination shows that there is a shadow either on one side or the other. For it is possible that a thickened mucous membrane will show a darkened area on one side with no actual pus in the cavity itself.

I have already referred to the normal drainage of the antrum. One must realize the relationship of the various sinuses, which will be spoken about later, and also appreciate the fact that the small opening of the antrum is situated in such a position that it can readily be occluded by an engorgement of the mucous membranes in this region, particularly an engorgement of the middle turbinate bone: Where normal drainage takes place, the mucus either goes down the throat or is blown out of the nose into a handkerchief. No one realizes the enormous amount of secretion normally taking place until there is an actual change in the condition of the mucosa due to some infection of the nasal cavities or of the antrum itself. When such takes place, the thickening of the secretion is so great that it is impossible in many instances to expel it, and a plug of mucous or pus stops up the normal opening.

Pathological conditions of the antrum may be divided into the acute, the subacute and the chronic. The rhinologist comes in contact with the two former classes more often than he does the latter, but it may be possible that some of the latter cases may be due to a rhinological condition, though it is my opinion that the majority of the chronic cases particularly with the formation of thick pus, are due to some necrosis of the alveolar process or of the teeth themselves. The acute condition manifests itself by a neuralgic pain which radiates to the side of the head and a peculiar sensitiveness of the cheek bone. One must be careful to differentiate this from an alveolar abscess. In one or two instances I have had patients sent to me with a diagnosis of an acute sinus condition, where an alveolar abscess was manifest and would have been detected by the oral surgeon or the dentist readily. The differential points between the two are mainly these—in the alveolar abscess one notices a great swelling of the cheek and gingival fold, while in the majority of sinus cases there is no swelling to be particularly noticed.

The acute cases divide themselves into those in which there is drainage from the nose and those in which there is no drainage, the latter being an empyema of the antrum. If the drainage is profuse, that is, if a number of handkerchiefs have to be used throughout the day, one may be satisfied that proper drainage is taking place through the normal opening. On the contrary, if there is acute pain in the antrum, which is evidenced by every jarring motion of the body, or a certain amount of dizziness, one may consider that there is an empyema or a closed cavity in which fluid or pus is present. This condition may be diagnosed in numerous ways which will be mentioned. It is surprising how drainage can take place from an acute condition of the antrum, without manifesting any serious results as far as actual injury to the mucous membranes of the nose or the throat. Sometimes an acute condition may resolve into a subacute or a chronic condition which will evenuate into an actual pathological lesion of the mucous membrane of the antrum. There may be no symptoms until the patient lights up an acute cold, whereupon the cavity becomes closed off. One may consider these cases belonging in the subacute class, when a patient has a constant drainage from the nose or else is constantly reinfecting the mucous membranes of the nose in such a way that he is hardly ever free from colds. I have known of a patient who has had a continual dripping in the back of his throat or has had one cold after another, where a diagnosis was not made for a considerable length of time and eventually was cleared up when the antrum was drained properly. When it comes to the chronic antral conditions on the contrary, one may consider that he is dealing, in the majority of instances, with something outside the rhinological field. Although it is possible that a chronic antral condition may be associated with a chronic condition of the other nasal sinuses, it is my opinion that the majority of cases of chronic disease of the antrum arise from some necrosis in the jaw or teeth. I have rarely seen a chronic infection of the antrum, without an affection of the other sinuses if the causative factors were nasal. The affection may have started as a nasal condition but in the majority of cases some diseased condition of the upper maxilla is present and the diseased condition of the antrum itself can never be entirely eliminated until, either the teeth are properly attended to or the necrosis of the bone is taken care of in the proper way.

DIAGNOSTIC POINTS OF VALUE.

Among the various diagnostic points which must be considered, in order to determine an antral condition, may be mentioned the following, transillumination, x ray, suction, puncture and washing, exploratory invasion.

1. *Transillumination.*—In any rhinologist's office an instrument of the most importance is an intense light which allows of proper transillumination of the antrum. The transillumination may be performed by placing the light in the patient's mouth against the upper maxillary bone, having the teeth and lips tightly closed and then comparing the two sides. If the antrum is clear, and the bone is not too thick, one will be able to see a crescentric zone of light underneath the eye and sometimes he will be able to see the retinal reflex. Transillumination is of great value when it is negative but in a great many instances one is able to see a difference in the shadows of the two sides and sometimes almost a complete blackness on one side which will make him feel that an antrum affection is present. However, one can slip up readily, and sometimes even when an x ray checks up. I have washed out many sinuses, showing such manifestations, and have been unable to feel that there was any diseased condition within the antrum which warranted the interference which I had given. Even with the best transillumination outfits in the majority of cases an x ray picture will have to be taken in order to determine whether a diseased antral condition is present or not. Here again, let me warn you that one should never make a diagnosis of a diseased antrum because the x ray findings show that there is a cloudiness on that side. You must realize that there must be acute, clinical symptoms present which must be taken into consideration in conjunction with the x ray or the transillumination findings. I, as well as others, have frequently been misled by the x ray picture and today I would not consider that I was justified in attempting the exploration of the antrum, unless I had a thorough, clinical picture which would corroborate the x ray picture.

Sometimes the patient complains of pain on one side of the face, of an indefinite nature, and nothing can be seen in the nose. However, when the mucous membranes are properly shrunk up with cocaine and adrenalin, it may be possible to determine that there is an occlusion of the normal opening. With the application of such medicines, sometimes the plug in the normal opening will come away, particularly if suction is used at the same time. Suction may be obtained from an electric suction pump or the water suction apparatus. If the former suction is used, very frequently a certain amount of mucopus can be drained out of the sinus and a diagnosis of the condition made in that way. However, sometimes the plug in the normal opening is so tight, that it is absolutely necessary to explore the antrum by washing it out. This may be accomplished either by the trocar and cannula or the Lichwitz needle. The procedure for doing this cannot be detailed here. I have never seen any harm done by an exploratory puncture of the antrum, but I am indeed surprised at the number of times the washings are negative. I am informed by a number of rhinologists that there is hardly a day when they do not feel justified in washing out the antrum in at least two or three cases. Considering that my practice is as large as many of theirs, it is a surprising fact that we find it unnecessary to wash out the antrum, perhaps, more than once or twice a week. Where actual, acute symptoms are present, there may be only an inflamed mucous membrane and in such instances, exploratory puncture will relieve this tension within the antral cavity which, in itself, may be enough to allow the symptoms to subside. One may make an exploratory puncture in the thin part of the antrum wall with a Lichwitz needle—a valuable and painless procedure.

However, if one feels that there is actually something within the antrum which actually needs drainage, it is better to make a large enough opening so that it will remain patent for a few days. This may be done with any of the numerous trocars and cannulae on the market or may be made with the antrum chisel. It may be possible in some instances that the affection from which the patient is suffering is not due to actual pus within the antrum but is due to granulation tissue therein. This is more likely to occur in chronic cases. Within recent months, certain instruments similar to the nasopharyngoscope have been devised which can be inserted into the antrum, through a large enough opening, and one may inspect the cavity without any difficulty. However, if one makes an opening of that size, he is in a position to probe the cavity and get an idea of its interior. If the mucous membrane is in a polypoid condition, no amount of interference by the rhinologist, it seems to me, will be enough to clear up the condition. For it is my opinion that the majority of these cases are associated with dental infections, in one way or another. Therefore, it is frequently necessary to make an exploratory puncture through the alveolar border so that an examination under actual, ocular inspection, of the parts within, may be made. Such an opening does little, if any, harm and one is able to view the antral wall and to state exactly whether there is anything there or not. If nothing is found, it is a simple procedure to sew up the mucous membrane again and allow the bone to reform.

From what has just been said, it is often difficult to state just which cases belong to the rhinologist and which to the oral surgeon. I am of the opinion that it is often impossible to tell at one examination who is the proper specialist to take care of the case. Yet, one may draw a dividing line as follows: the majority of acute and subacute antral cases belong to the rhinologist, and this includes antral conditions which are associated with affections of the other sinuses. The majority of chronic antral infections which extend over a long period of time should be attended to by the oral surgeon or the dentist; at least, no interference should be attempted by the rhinological surgeon, until a definite opinion is given by a specialist in the other field. There is one other point of importance: if granulation tissue has been determined upon as being present in the antrum an opening in the inferior meatus of the nose, with irrigation and drainage, is not sufficient to allow of a thorough cure, mainly for the reason that in the majority of the cases the floor of the antrum is lower than the floor of the nose, and therefore one would have to depend upon getting uphill drainage. That does not mean to say, however, that the rhinological surgeon should not attempt an operation, like the Caldwell-Luc, but I feel that, with the more minute accuracy with which the oral surgeon is able to do operations under local anesthesia, such operations belong to him, rather than to the rhinologist.

I could cite a number of cases which I have referred to oral surgeons, which show definitely that the work that had to be performed upon the patient was work which should not be attempted by a nose and throat surgeon. Within the past few years I have had a few such interesting cases, the citation of one or two of which will suffice.

Case I.—The first patient was a man who had had a nauseating discharge from his nose which had lasted for a good many years. There was a small sinus above one of the molar teeth. After examining him thoroughly and determining that the antrum was diseased, I decided that he had better be attended to by an oral surgeon and therefore I referred him to Dr. Joseph Levy, who completely opened up the antrum and found it filled with an enormous amount of thick greenish pus and granulation tissue. The operation was thoroughly done, every part of the cavity minutely explored, with the result that when it finally closed up, the patient was completely cured. Now I feel that, if I had attempted to take care of this case, it would have been necessary for me to have infringed upon the field of the oral surgeon, for in the operation it was found that the roots of two or three of the teeth which penetrated the antrum were necrosed and part of the jawbone also showed necrosis. I feel that the attendance of an oral surgeon, in such a case, is not all that is necessary. The oral surgeon is in a much better position to perform any operation through the alveolar border. He is used to administering local anesthesia to these parts and is also in a position to remove necrosed teeth and diseased maxillary bone. Sometimes we come across anomalous conditions in which there is every evidence of an antral infection, and in such instances, even when the case is taken care of by an expert oral surgeon, no definite determination can be made as to the exact cause of the condition. This is particularly evident when on exploration of the sinus it is found to contain no granulations or pus. A recent instance will illustrate this.

Case II.—A patient came to me, complaining of a great deal of pain over one side of his face with severe headaches. He had been told that there were a number of diseased teeth. Examination of the antrum, by transillumination, showed it absolutely black. The other antrum was clear. This finding was confirmed by x ray pictures, and so I thought that it was necessary that his antrum be explored, preferably, by an oral surgeon. I therefore referred him to Dr. Theodore Blum, who, much against his wishes, removed a necrosed tooth and a small portion of the upper maxillary bone and then made a small window opening into the antrum.. He saw that the antrum was clear, but in order to definitely determine this fact he took away a great deal more of the wall and found that there was absolutely no lesion of the mucous membrane. Here was an instance in which there was definite evidence by transillumination and x ray that there was a lesion of the antrum, and yet none was found. How can we account for the fact that these two diagnostic aids led us astray? I cannot say. I felt that we were justified in going into this antrum and yet the finding was not sufficient to warrant our doing what we did.

What is the relation of the antrum to the other sinuses in the nose and what is the value of this relationship? The antrum has a definite relationship insofar that the normal drainage of all the sinuses takes place in a certain part of the nose, called the vicious circle. This is in the region of the middle turbinate bone. Here enter the openings of the frontal sinuses, the antrum, the ethmoid cells, particularly the anterior ethmoid cells, and some of the posterior and the sphenoid. If one has an acute affection of the mucous membrane of the nose, it is but natural that all the openings of the sinuses should be closed and it is a well known fact that once there is an inflammation of any of the sinuses, some inflammatory condition of the other sinuses will take place. Moreover, one may have an acute affection of the frontal sinus or of the ethmoid cells and the direct drainage may take place through the antrum so that it becomes infected. In such instances, the infection may change from an acute into a chronic one, but at all times the patient should be in the hands of the rhinological surgeon. One must make up his mind to take many things into consideration when he wishes to definitely determine the relationship of the antrum to various other sinuses of the head and to the jaws or to the teeth.

One fact, of great importance, is the determination of the amount of discharge through the nose, and another point of great importance is the determination of the causative organism. There are various organisms which, apparently, do very little harm within the nose which may create pus, but pus of a nonvirulent character. Such organisms may well be taken care of by thoroughly irrigating the sinuses, particularly the antrum, with some antiseptic solution. On the contrary, if one is dealing with one of the various streptococci or pneumococci, it is necessary for him to go further to eliminate the organism, and he will almost invariably find that if one of them is present, there is an infection of one or more of the other sinuses and that it is necessary to treat them at the same time.

It is almost impossible for one to realize that the normal secretions of the sinuses amount to about a quart of mucus a day, most of which is swallowed. One only gets an idea of the actual state of affairs when the character of the mucus is changed by infection and he either has to expectorate this mucus, which goes down the back of his throat, or he has to blow it out in a handkerchief. With our greater knowledge of the actual anatomy of the sinuses, and their various anomalies, it is possible for us to very often determine how much of a sinus is affected, how many of the sinuses are affected, and the effect of such infection on other parts. Of course, deductions are not always very definite or accurate, but they can be made in many cases, and in some of these cases in which infection is found, very little may be determined either by transillumination or the x ray or by the clinical findings. For example, in pathological lesions of the eye, certain cells of the ethmoid labyrinth are affected in such a way as to cause definite pressure upon the optic nerve, yet our examinations show absolutely negative findings. However, if the sinuses are properly opened up and what is called aeration of the sinuses is affected, it is surprising to see how quickly the eye condition responds to that opening up and how eventually the patient gets well. It frequently happens that a direct irritation, either of an antrum or of one of the sinuses, may cause reflex symptoms in other parts of the body which may be of a serious nature, and it is only after the elimination of the localized condition that one is able to determine exactly how much value may be placed upon the clinical evidence which is given by an affection of one of these parts.

It would be impossible to go into great detail of all the affections of the sinuses at a meeting such as this. I think I have been able to show you that there is a direct relationship between the work on the sinuses which should be performed by the rhinologist and that which should be performed by the oral surgeon or the dentist. In regard to treatment, it is only necessary to say that when it comes to the acute or subacute condition of the sinus, a thorough cleaning of the nose, with proper irrigations, will accomplish a great deal. Irrigations may be performed in numerous ways, the details of which are unnecessary at the present time. When it comes to the chronic antral condition, it is absolutely necessary that a proper opening up of the sinus be performed. It is a harmless procedure, in the majority of cases, although it may be a more or less painful one and the patient is far better off to have a thorough exploration of the sinus, in spite of almost negative findings, particularly if the symptoms are severe enough to invalid him a great deal of the time.

2178 Broadway.

Case of Perisinus Abscess*

By J. COLEMAN SCAL, M.D.,
New York.
Adjunct Otolaryngological Department, Gouverneur Hospital.

Cases of perisinus abscess although quite common are of sufficient interest to warrant reporting. In this case the latent development and the disappearance of all symptoms immediately after operation were especially interesting.

Case.—J. K., aged fifty-five, single, laborer. Admitted to Gouverneur Hospital October 9, 1922, in the service of Dr. W. W. Carter.

For four months before admission the patient had suffered from severe pain and discharge from both ears. These symptoms gradually subsided until a few days before admission, when the region behind the right ear became swollen and caused severe pains in both the right ear and in the frontal region of the head. He had not consulted any physician until this time. He was admitted to Gouverneur Hospital for immediate operation.

The patient was a well developed and fairly well nourished man apparently suffering excruciating pain over the frontal region of the head and over the right mastoid. His eyes reacted normally to light and accommodation. The nose, throat and sinuses were negative. Temperature on admission was 98°, respiration 36, pulse 86. The blood examination showed leucocytes 16,000, polymorphonuclears, seventy-six per cent., lymphocytes twenty-four per cent.

The left ear showed a thickened drum with a large perforation and purulent discharge. No pain or mastoid tenderness was present. The hearing was not diminished.

The right ear showed a red, bulging drum with a marked sagging of the roof of the canal. There were three perforations in the drum, the largest of which was situated about the middle of Schrapnel's membrane. There was a scant, seropurulent, foul smelling discharge present in the external auditory canal. A marked pulsation was evident through the perforations. The mastoid presented a distinct edema and swelling over the upper portion, with tenderness at the tip. The ear was pushed forward. Hearing was diminished.

A simple mastoidectomy was performed. As soon as the periosteum was separated and elevated, pus gushed from two or three small broken down areas in the cortex. Pus and granulations were found when the mastoid was opened. The antrum was located, exposed, and found filled with granulations; but there was no pus present. The sinus was exposed from behind the knee to the horizontal plane; the thin covering of bone over it was soft and partly broken down. Removal of this thin bone revealed a perisinus abscess in the region of the knee. The sinus wall was covered with healthy granulations. The sinus itself was of a shiny bluish color and pulsating. As no symptoms of sinus thrombosis existed the interior was not disturbed. A section of the inner table of the bone was removed from the knee and the dura exposed. No epidural pus was found. The cavity was drained lightly with iodoform gauze.

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*From the Otolaryngological Department of Dr. W. W. Carter of Gouverneur Hospital.

The postoperative course was uneventful. The temperature rose to 100.5° but dropped to 99° on the second day and then remained normal. The patient was allowed out of bed on the fifth day and discharged from the hospital at the end of the third week, the wound being healed and the ear dry.

950 Park Avenue.

Suicide Among American Physicians—Its Causes and Suggestions for Prevention*

By S. ADOLPHUS KNOPF, M.D.,
New York.

Certain of our medical and lay papers recently published some startling statistics concerning the number of suicides among professional men. In the United States during the year 1921 there were the following number of suicides: Physicians, sixty-nine; judges, fifty-seven; bank presidents, thirty-seven; clergymen, twenty-two; editors, ten; statesmen (members of legislatures), seven. Through the courtesy of Dr. George H. Simmons, the editor of the *Journal of the American Medical Association,* I have come into possession of statistics of suicides among physicians in the United States for the past ten years which reveal a startling situation. These figures are as follows: In 1912, 36; 1913, 43; 1914, 27; 1915, 44; 1916, 39; 1917, 31; 1918, 39; 1919, 38; 1920, 32; and 1921, 69. This means that the number of suicides among American physicians has increased over a hundred per cent. during the past year as compared with 1920. I have no explanation for this sudden increase, except perhaps that it is a delayed aftermath of the World War with its economical, moral and psychical disturbances. Whatever the cause may be, this sudden increase is certainly alarming.

It is really pathetic that among the members of the profession whose prime objects are to preserve life by protecting individuals and communities from infectious diseases, epidemics, and plagues, who as surgeons or physicians heal wounds, cure disease, comfort and console the suffering in mind and body, there should be the greatest number of suicides of all the professional classes! In a paper dealing also with the subject of suicides observed among physicians, Dr. S. Dana Hubbard, Director of the Bureau of Publicity of the New York City Health Department, who has investigated a large number of suicides, says that he does not wish to be unfair to his professional brethren, but that unfortunately a thirty years' experience in the practice of medicine has furnished a number of opportunities to him of seeing professional confrères terminating their lives too abruptly. He then adds the following significant statement: "Many of these cases were masked officially for one reason or another so that the truth was hidden; nevertheless the fact remains, when the truth is known, that selfdestruction was the cause and not that which was furnished by the death certificate."

In a recent letter to the New York Medical Journal the same author, in giving virtually the same statistics of suicides among physicians as Dr. Simmons, deplores this frequency of suicides, and says: "This record seems to indicate that the occupational strain is greater in medicine than in any of the other professions. Should not our scheme of medical practice, as relates to hours and relief, be revised and, if so, how should this be accomplished?"

My good friend Hubbard will forgive me if I seem to differ with him when I say that strain is not the only cause of the mental attitude which prompts this large number of colleagues to take their own lives. Many young men enter the profession with exalted ideas of obtaining wealth and fame. They should be reminded at the outstart that the one who has decided to choose medicine for his life's calling must not do so with the idea that it will be easy to climb and to become a great surgeon or internist with a fabulous income. Only those who enter the ranks with an earnest desire to serve, to work for the good of others with no thought of selfaggrandisement or gain of wealth, and to be content to make a comfortable living and cling to the highest ethical standard, will really achieve success. To those who have less high motives, who look upon the medical profession merely as a business proposition, there will be bitter disappointments and disillusionment.

Among those who cannot realize their unfitness for the calling of a physician and have not the courage to take up some other pursuit, there will always be some who may enter illicit practice, and because of this they may even be financially successful; then something happens and, facing exposure, they abruptly finish their existence.

Suicide statistics always reveal that the unmarried predominate over the married. Personally, I know any number of brilliant surgeons and physicians well able to support a wife and family, who remain single and say as an excuse for this that they have no time to get married. Some use the poetical phrase that they are married to their profession. This is all well and good, but no profession can replace the comforts of a home, the devotion of a loving wife, or the laughter of happy children. Therefore my advice to the young doctor would be as follows: Get married as soon as you can establish a home with an average degree of comfort. It does not cost so very much more than living alone. Carry an insurance according to your income. Live as normal, healthy, and sanitary a life as you would wish your patients to lead.

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*Read before the Society of Medical Jurisprudence at the New York Academy of Medicine, November 13, 1922.

A dingy, cheerless, badly ventilated, dusty and untidy reception room and office is depressing to the physician as well as to the patient. The reverse condition, a neat, bright, cheerful, and well ventilated office is good for the mental attitude of physician and patient alike.

Have yourself examined every year by some competent colleague so that any insidious trouble may be discovered and treated before it is too late.

Selfpreservation is essential for the physician as well as for anyone else. While he should never neglect his medical duties for superficial social functions, let him enjoy sound social life and participate in all that is good and uplifting and all that will cheer him in his work. Let him attend medical meetings, but not associate exclusively with doctors where "shop" as a rule is the only topic of conversation. Among his recreations should be some which demand at least a few hours of outdoor life during the week.

Now as to the direct prevention of strain! Let us begin with the general practitioner, the one who is robbed of the greatest number of hours of sleep during the year by confinement cases, and who therefore has the greatest physical and mental strain imposed upon him. How can he arrange the number of confinements so that they will not tax his strength to the utmost as they sometimes do? Let two or three colleagues come to an understanding to arrange the confinement cases among themselves in such a way that they will be equally distributed and not cause the breakdown of one or another colleague. When a woman engages a physician to attend to her confinement, let the physician make it clear to her that if he cannot come at the time, Dr. A or Dr. B will attend to her. It must be obvious that through such an arrangement no one will suffer, but the hard working physician will be benefited.

The general practitioner with a large office practice should bear in mind that he cannot do justice to his cases nor to himself if he sees too many patients at a time, and that he cannot diagnose difficult cases when overtired. The latter cases should be received by special appointment outside of the office hours.

It is an honor to be attached as attending physician or surgeon to a hospital; but it is unwise and unfair to accept appointments as visiting physician or surgeon in many hospitals. It is unwise because the attending surgeon or physician puts on himself too great a strain by too much hospital service. It is unjust toward other colleagues equally able, who for one reason or another have not received a hospital appointment, and lastly, and by no means least, it is unfair to the hospital patients who cannot get the care and attention they are entitled to when the physician who sees them is himself overtired physically and mentally.

One fact which in my opinion is perhaps the direct cause of more suicides than anything else is the use of habit forming drugs such as morphine, cocaine, and heroin. A few years ago, beside my tuberculosis service at the Riverside Hospital there was established a large service for the cure of drug addicts under the direction of Dr. T. F. Joyce. There were always a few physicians among them. I had many a chat with Dr. Joyce relating to the primary causes of drug addiction in physicians. It had been found that it was almost invariably the overstrain resulting from sleepless nights on account of confinement cases succeeding night after night, combined with attending to a large general practice during the day, which prompted the taking of drugs as stimulants.

To remove all possible doubt concerning the accuracy of this statement, let me read to you from a letter received from my friend, Professor Alexander Lambert, of Cornell Medical College, who has perhaps the largest experience of any one in this city in the treatment of drug addicts: "Of 1,700 drug addictions in private practice of my own experience or of my own knowledge, 405 have been doctors. The greatest strain has come from worry and overwork, 163 coming under that heading. They broke in the late twenties, around thirty and before forty years of age, in the vast majority; i. e., 165 of the 405 when they were building up their practice and trying to swing it all without assistance and under the weight of responsibilities with but little savings."

Before a man gets into such a physical and mental condition he should be told: Rest when you are tired; refuse night calls; get away from work entirely for a day or two or more if necessary, but never, never seek relief in drugs which you would not prescribe for your patients, and bear in mind that no matter how strong a will power you may possess prior to the habitual use of morphine you can no more control your desire for the drug once the habit is acquired, than the least intellectual or the least moral morphine, cocaine, or heroin habitué.

To the young medical or pharmaceutical intern, who for curiosity's sake takes a few snuffs of cocaine or thinks he can safely experiment on himself with other narcotics too strong a "Don't do it" cannot be pronounced. In many cases of habitual addiction, particularly when the victim is a physician who has no difficulty in getting all the narcotics he wishes, the doses are constantly increased in order to get the desired effect, until an overdose accidentally taken leads to a fatal result. The thought that he may never be able to master his craving also often leads the physician-habitué to the taking of an intentional overdose. Nevertheless, even the chronic user of narcotics of no matter what kind, need no more despair of a complete cure than the chronic alcoholic, if he is only determined to cooperate with the physician in whose care he has entrusted his case.

Moments of regret and an ardent desire to get rid of the degrading and life consuming habit are sure to come and the sooner this happens the better. When these moments do come, then is the time to seek the advice of a colleague familiar with the methods to cure drug addiction. In some cases it may perhaps be better to enter a special institution for that purpose. If the patient fears that his being an inmate in a local hospital or sanitarium might become known in his community, let him apply to the editors of any reputable medical journal, or to the chiefs of the health departments of any of our big cities, and I am sure any one appealed to will gladly supply the inquirer with a list of reputable institutions where the unfortunate victim will have the best possible chance to obtain a thorough and lasting cure.

What are the psychical causes which may depress the physician to such a degree as to create a desire to finish his earthly existence? When the sympathy which he should always have for his patients develops into a morbid sentimentality; when he is too much affected by the hopelessness of some cases and cannot reconcile himself to the fact that what cannot be cured must be endured; when he cannot realize that even with all our advances in medicine and surgery there will be always cases which do not yield to treatment; and when he broods over such cases, there is danger of his mind becoming affected and of his growing morose and despondent. A wrong diagnosis with sad consequences, or failure in an operation, are serious matters, but not enough to cause the sacrifice of a second life. Every physician must strive to develop a sound philosophy of life. He must realize man's inability to know all the whys and the wherefors and that to do the best one can under all circumstances, is the only remedy. Life has its pains and also has its pleasures, but above all life is a duty, and duty well done will find its own reward.

Perhaps one reason why the medical profession has the sad distinction of furnishing the greatest number of suicides among professional men is the lack of a spiritual conception of life, a tendency to disbelief in all things spiritual, and an acceptance of the erroneous idea that to do away with the physical existence ends all. All religions teach the immortality of the soul, the existence of a physical and of a spiritual being, and the continuity of life as an entity. Those of us who have witnessed many deathbed scenes will long since have abandoned the medical student's conception of death. To many of the young followers of Æsculapius the dissecting room is the last resting place of most and would be the finishing episode of the existence of all of us, if we should have no one to take care of our "mortal coil."

The great physician-poet Oliver Wendell Holmes was once approached by one of his students during a lecture in the dissecting room with the following query: "Dr. Holmes, if there is such a thing as a soul please show me its location." The great anatomist's reply was, "Only a fool will look for the soul with a knife." Dr. John H. Finley, in a recent article entitled A New Spiritual Century in Contrast with the Old, speaks of a prominent American chemist who, at an international meeting of chemists last year, said that there was something that could not be explained on a purely materialistic hypothesis. Another eminent scientist and at the same time one of the greatest physicians of the Anglo-Saxon race, Sir William Osler, Bart., Regius Professor of Medicine, Oxford, recognized authority on internal medicine throughout the civilized world, who died a few years ago at the age of seventy, a victim of too strenuous work on behalf of the sick and wounded soldiers, during his lifetime was considered an honest agnostic by many of his admirers. And yet in his address on "Science and Immortality" at Harvard University in 1904, we read, "Rather be mistaken with Plato than be in the right with those who deny altogether life after death, and this is my own *confessio fedei.*" Among his effects the following note was found which he had penned a few days before his death: "Dear Friends, the harbor is nearly reached, after a splendid voyage with such companions all the way, and my boy waiting for me." His son, Lieutenant Revere Osler, had made the supreme sacrifice in the World War, and Sir William then felt sure to meet him. He had become convinced that physical death was not the end of conscious individual existence.

It is perfectly rational to believe (and with many the belief is so strong as to amount to conviction) that death does not end all, and that those who voluntarily end their physical existence must experience infinite regret for not having been brave enough to have kept on battling. Psychology teaches and psychologists have demonstrated that the mind of one individual can control that of another, not only in the hypnotic but also in the wakeful state, and even without a tangible medium of transmission—speech, writing, or signs. Each mind represents an individuality different from that of another, that is to say, an entity. This entity is demonstrated in hypnotism, psychoanalysis, and that wonderful phenomenon called telepathy. This personal self is also felt by all thinking people in their daily lives. As an entity it cannot perish or disintegrate but must persist in its existence; for the individual soul there is no "Nirvana" (going up into a great oneness or nothingness) where all its past can be forgotten.

The attempt has often been made by kindhearted philanthropists to invite those who are despondent and heart sick and ready to finish their earthly existence to come to them and seek counsel and advice, and in a number of such instances a tragedy has been averted. There is an organization in existence in this city which has this unique mission and operates under the name of "The Save-A-Life League" with headquarters at 309 West Fifty-seventh Street. Whether or not the establishment of an institution or bureau for this purpose would be helpful to prevent our despondent medical brethren from resorting to suicide, I am not prepared to say. If some one in the profession with greater world wisdom thinks such an enterprise feasible, I will gladly serve under him. In the meantime, let all those who are sad in heart, depressed and despondent, take comfort and rest assured that if they will follow my humble suggestions for the prevention of despondency, they will surely see a brighter vision and better prospects for the future.

We must speak of one other cause which has led quite a number of physicians to commit suicide, and that is financial failure and ruin because of stock speculation. Unscrupulous brokers with get-rich-quick and high interest schemes usually make their attack first on the medical profession. They know that the average doctor has no business sense and no idea of the stock market, and as a rule he is considered by them as an easy mark. His mail is laden with offers of all sorts of sure and rapid methods to increase his wealth by the purchase of stock; mining, oil, automobile, or other kinds. He is visited or phoned to by glib tongued brokers and not infrequently becomes their victim. As it happens so often, a seemingly considerable sudden gain skilfully brought about by dishonest means makes the physician think that he will do better by speculating than by practicing medicine. His mind is no longer on his work and he begins to neglect his patients. The outcome of it all is alas too often the loss of all the savings and an accumulation of debts resulting from stocks bought on a margin. Realizing a dark future and inevitable ruin, altogether too many splendid colleagues have ended it by an overdose of the easily accessible narcotic. The prophylaxis in such cases is plain. Stay away from the stock market, invest your savings in securities which are secure even if they bring only five or six per cent. In other words, accumulate slowly but surely and you will be happier in the end.

The thought of suicide often enters the mind when there is fear that there will be no home and comfort of life when the individual is no longer able to earn and when circumstances beyond control have prevented any saving for maintenance in old age. This happens occasionally and more often perhaps among medical men than becomes generally known. To prevent those of our colleagues from becoming despondent and rushing off to end their existence, who often in spite of years of labor have not accumulated enough to assure them a carefree existence at an age when they can no longer work, let us who are in happier and more comfortable circumstances unite to establish a home for homeless, poor, and aged physicians where they may finish their days in peace and comfort. If married, they should be allowed to bring wives with them. To do all that can be done to make them happy and contented should be the aim of us who are still in the prime of life and able to help. To make the inmates of such an old physicians' home feel that they are not objects of charity but are entitled to what they receive, a society to which each member of the American medical profession might contribute a small amount annually, say one dollar, which would mean one hundred thousand dollars or more a year, might very easily be called into life. This, of course, should not exclude any generous donor who might wish to contribute a substantial sum toward a permanent endowment fund. Either the American Medical Association, the American Congress of Physicians, or some other national medical body should be made the depository or guardian of such a fund.

Such a fund and home for New York physicians has been already established and it owes its inception to Dr. W. Freudenthal, Dr. Robert T. Morris, and other prominent members of the New York medical profession. No doubt several of such homes in various sections of the country would be needed, but all should be under the supervision of an authorized and elected body of leading medical men of the United States.

I have reason to believe that even among the grateful patients of means there are many who would gladly give help in such a noble and worthy work of justice, and I know that many poor would just as gladly give their mite, but this of course we would not wish to accept. We do not ask for charity. I do not like the word in this connection. Every doctor does his share of charity in his practice and it would be only a just compensation for the innumerable services he has rendered without pay to the sick poor and thus to the community. He should be assured of an existence without care and anxiety when no longer able to work by reason of old age or infirmity. Assurance that if he is but true to his calling, a grateful public and his well to do confrères will see to it that he shall not be in want, homeless or friendless when old age comes on, no matter what misfortune may overtake him, will surely prevent the doctor from thinking of selfdestruction and shortening his career by a rash act.

We may not always realize it, but our beloved profession stands as a whole in high repute in the eyes of the public and many are the prayers and the tributes which come from grateful patients who duly appreciate the physician's calling and the services he renders to suffering mankind. Let him who is despondent because he imagines that all his efforts are in vain and that the physician's life is not worth living, read the beautiful tribute recently pronounced by no less a man than the Hon. Alton B. Parker, formerly Chief Justice of the Court of Appeals of the State of New York, who says: "Where will you find another man to match the average doctor? He lives the true altruistic life, devoting himself unreservedly to others. His skill and time are yours on the shortest notice, in the blackest hour of night, and in the worst of weather. His devoted unselfishness, ready sympathy and healthy good humor but increase his gray hairs. I, for one, expect to find a neat M. D. shingle decorating very many of the more palatial Heavenly Mansions on Good and Faithful Avenue."

In an admirable treatise on Suicide, John Rice Minor, Ph. D. (1), says: "The person who commits suicide dies because his mind is unable to make a satisfactory psychic or social adjustment to his environment." According to information kindly furnished me by Dr. Louis I. Dublin, the statistician of the Metropolitan Life Insurance Company, there were 9,000 suicides in the registration area, which would mean not less than 10,500 in the whole United States in one single year (1920). If we add to this number the many cases which are not reported officially as suicides but where, for various reasons, other causes of death are given, we may well feel alarmed. As physicians who are called upon to help a mind diseased as well as to alleviate physical sufferings, should we not strive in this age of great humanitarian efforts and social progress to stop the increasing deathrate from suicide among our own and other professions and among the people at large? Let us direct our efforts to that end. To save a life from selfdestruction is as great an achievement in the physician's calling as to save a life from a deathly disease by medical or surgical skill.

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16 WEST NINETY-FIFTH STREET.

The Significance of the Protein Skin Reactions in Bronchial Asthma*

By M. MURRAY PESHKIN, M. D.,
New York.

The voluminous literature contributed to the subject of bronchial asthma studied along the lines of protein sensitization, has tended to create considerable confusion, particularly when one attempts to analyze the varying results obtained from the methods of procedure and the interpretation of the reactions. In the past five years considerable progress has been made; much, however, remains obscure for the surface has been scarcely scratched. No thesis on this subject can be considered complete unless mention is made of such pioneers as Schloss, Walker, Cooke, and Vander Veer, each of whom has worked along his own original line and has thus blazed a separate trail.

The purposes of this paper are:

1. To discuss only those cases of bronchial asthma exhibiting cutaneous reactions above the control.

2. To try to arrive at a clearer conception of the reaction in its relation to symptoms.

3. To emphasize the value of performing a complete series of food, epidermal, pollen, and bacterial protein tests in every case presenting itself for diagnosis.

4. To emphasize the importance of correlating the skin findings with a detailed history and a thorough physical examination as will be outlined.

5. To show that the wide range of differences in percentages of reactions depends upon many factors.

In order to clarify our ideas regarding the etiology of asthma and to avoid adding to the existing confusion, it becomes essential to lay down certain basic requirements, at least one of which must be fulfilled, before we can assume that any protein is etiologically important in a given case of bronchial asthma. Thus, sensitization must be demonstrated by a local cutaneous reaction; the symptoms must be relieved or greatly improved upon withdrawal of or by treatment with the protein, as the findings may indicate. An attempt should be made to show that the patient has come in contact with the suspected protein.

We do not deem it wise nor always safe to subject a sensitive person to a subcutaneous injection of the offending protein in order to demonstrate cause and effect. This experiment is not without possible serious or even dangerous consequences. Several deaths have been reported and deaths are known to have occurred that were not reported. It is well known that every sensitive patient has acquired a certain degree of protein tolerance and that the finding of a cutaneous reaction does not necessarily predicate symptoms. Then why break down tolerance by experimental means contributing other etiological factors to the existing asthmatic state? It seems to us more rational to withdraw the offending protein, or if this method is found impracticable or impossible then institute specific desensitization and observe results carefully.

Bronchial asthma exhibiting protein reactions above the control may well be classified into the following main groups:

1. Cases of asthma occurring during infancy and childhood only.
2. Cases in adults with onset of asthma dating back to infancy or childhood. A. Investigated and treated before the age of forty. B. Investigated and treated after the age of forty.
3. All cases with date of onset following the period of childhood and up to forty years. A. Investigated and treated before the age of forty. B. Investigated and treated after the age of forty.
4. All cases with symptoms of asthma becoming manifest after the age of forty with or without organic changes.
5. Occupational group.
6. Accidental passive anaphylactic group.

The preceding gross classification is further divided into the following etiological sensitizations:

1. Food.
2. Epidermal and dust proteins
3. Pollen.
4. Bacteria.
5. Drugs.
6. Therapeutic animal sera.

The procedure employed in the search for an etiological basis in bronchial asthma involves a detailed history, physical examination and cutaneous protein tests, each inseparably dependent upon the other.

The importance of securing a proper history can not be emphasized too strongly. Commencing with the age of onset, it must be definitely ascertained if complete relief followed a typical bronchospasm and whether or not it was associated with nasal or eye symptoms. The season of the year, the effect of food or internal medication and exposure to domestic animals must all be noted. A history of repeated attacks of recurrent bronchitis or rhinitis with occasional wheezing often points to bacterial infection. From this point it is most advantageous to carry the patient along in his history to the latest attack, because the early attacks bear a definite relationship to sensitization. The present age, frequency and duration of attacks, effect of environment, change in residence or occupation, should be noted; inquiry made about the pillows, covers and mattress, and if changed what the noted effect is upon the asthmatic attacks. In fact, anything in the home of protein nature must undergo careful investigation.

Some attacks definitely follow an acute infectious disease, such as pneumonia, influenza, and occasionally the acute exanthemata, most commonly measles. This type of asthma is frequently relieved by a change in climate. It is not uncommon to observe absolute freedom from all bronchial symptoms following an acute infectious disease. One of the most severe cases of asthma, of three years' duration, having three to six bronchial spasms daily requiring injections of a total of one dram of a one to one thousand solution of adrenalin chloride in twenty-four hours, occurred in a married woman aged thirty. Her asthma proved refractory to all forms of treatment. She prayed for an acute lobar pneumonia to set in, a previous attack having given her complete relief from asthma for two months.

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*Read before the Yorkville Medical Society, New York, April 17, 1922.

A history of eczema in childhood, especially during the nursing period, strongly suggests food sensitization. Contact with certain individuals may induce or aggravate an attack of asthma. A married woman aged thirty-eight, living in the country, gave a definite history of attacks when in the presence of her neighbor who was a teamster. When skin tests revealed marked reactions to horse dander, she then recalled becoming severely ill when riding in a horse drawn vehicle.

An interesting case is that of M. B., an eight year old girl who suffered during the last four years from bronchial spasms whenever she visited a chronically ill maternal grandmother. The mother revealed upon close questioning that the child found relief in her own home, in which she never remained for more than a week. A strong reaction to rabbit hair caused search to be made in both homes, when pillows made of rabbit hair were found in the grandmother's house only. The removal of these has resulted in freedom from all attacks for the past four months.

A thorough physical examination is essential. Search for organic or structural changes, endocrine dysfunctions, gastrointestinal disturbances and for focal infection, must be made. The association of nasal obstruction and accessory sinus infection with many early and advanced cases of asthma is important and must be treated. However, many cases such as spasmodic rhinorrhea and sneezing, the so-called, and, perhaps, illnamed, vasomotor rhinitis and the noninfective cold, seem to justify the assumption that such phenomena are the local manifestations of some general state. A patient may be sensitive to several proteins and yet the attacks follow other conditions, such as fatigue, worry or changes in weather. Such multiplicity of excitants call for a search for some basal condition responsible for the susceptibility. The blood chemistry may give the only clue in some cases. Low calcium in the blood, corrected by intravenous injections, has cleared up some resistant cases.

Our experience has taught us that in order to study asthma properly from all viewpoints it becomes necessary as a routine practice to include all possible available food, epidermal, pollen, bacterial and dust proteins in every case, in any event not less than a hundred tests to a case. The cutaneous test is exclusively employed. All proteins we employ are prepared by the methods and under the supervision of R. P. Wodehouse. The variously recorded results of the skin tests are at times difficult of analysis. The explanation for these differences and wide range of percentages depends chiefly upon the fact that the proteins used are differently prepared; and the reading of the reactions are differently interpreted, due to lack of standardization and differences in the personal equation of the observer. The age, age of onset, environment, nationality, occupation of the patient and the number of proteins employed for testing must all be carefully considered in the final analysis. Most reports include hay fever and hay asthma cases, which we believe serves only to distort a correct analysis of the relative frequency of protein sensitization in bronchial asthma.

Sanford (1), employing the Walker technic, reports positive cutaneous reactions in only twenty-five per cent. of the eight hundred cases studied. Sterling (2), testing with food proteins only, found one positive case in a series of twelve asthmatics.

Cooke (3), in a careful study of a hundred cases of asthma tested by the intradermic method, found forty-three per cent. with multiple sensitization; thirty-one per cent. reacted to the pollens of early hay fever and thirty-one per cent. to the late hay fever. Only nine per cent. reacted with sachet, forty-four per cent. to animal dander, and thirty-four per cent. to one or more up to twenty food reactions; three per cent. showed distinct foci of infection; thirty-three per cent. had a complicating simple bronchitis, and six per cent. a clinically demonstrable tuberculous infection with symptoms of a true bronchial asthma.

George Piness (4), utilizing the Cooke technic, in a study of 150 cases, determined the etiology in from forty-seven to fifty per cent. of the cases. Multiple sensitization was common, especially in the food and pollen group. He found nineteen per cent. sensitive to the animal group, twenty-eight per cent. to foods, fourteen per cent. to the bacterial group, and twenty-six per cent. to the early and late pollens.

Walker (5), in a classical study of four hundred cases, found 191, or forty-eight per cent., gave positive cutaneous reactions and more than fifty per cent. of these were sensitive to more than one protein. A summary showing four fifths of the patients whose asthma began during infancy were sensitive; two thirds of those whose asthma began during childhood were sensitive; one half of those whose asthma began during young adult life were sensitive, none were sensitive who began after middle life. Thus, as the age of onset of asthma increases, the frequency of sensitization decreases. The following results have been taken from a study by Walker (6) of over six hundred cases. Of the total number of patients studied, positive reactions to the protein groups were obtained as follows: Seventy-four patients or twelve per cent. to food; sixty patients or ten per cent. to bacteria; one hundred patients or sixteen per cent. to animal emanations; sixty-six patients or eleven per cent. to pollen, thus finding three hundred patients sensitive of the six hundred cases studied.

FOOD PROTEINS AS THE CAUSE OF ASTHMA.

The chief offenders of the foods are the cereal grains, mainly the wheat grains. Next in order of frequency are rice, corn, rye, oat, and barley. On the East Side of New York where rye bread is most commonly used, rye sensitization in our experience ranks second to that of wheat. It is generally recognized that the greatest percentage of food reactions occur during infancy and childhood, being more numerous in infancy. Next to cereal grain, eggs and milk in the order named are the most common offenders, and with the succeeding ages of onset the frequency of sensitization to cereals, eggs, and milk is much less than for other foods such as fish, meat, and potatoes. In asthma developing after the period of childhood food plays a minor rôle.

Of 648 cases of asthma examined by Rackermann (7), nineteen cases or three per cent. were due to food sensitization, the patient's symptoms being definitely relieved when the offending foods were eliminated from the diet. Eleven of these nineteen cases occurred in children.

EPIDERMAL PROTEINS AS THE CAUSE OF ASTHMA.

This type of sensitization in conjunction with organic dust is responsible for more cases of asthma than any of the other protein groups. More than half of the epidermal sensitizations are due to horse hair and dander alone. Most patients giving a history of onset between the ages of two to ten and in those giving positive reactions past that age the trouble could usually be traced to occupation. Much less frequently cat hair and chicken feathers will cause asthma. Occasionally it is caused by sheep wool, cattle hair, camel hair, parrot feathers, and other foreign proteins. These can usually be detected by a careful investigation into the history and environment of the patient. From our observations chicken feather sensitization is uncommon in Jewish patients because it is rarely used for pillows or feather beds. When present it usually can be traced to occupation. However, goose and duck feathers are commonly used and give relatively frequent sensitizations. It is most interesting to note that dog hair is the least common cause of bronchial asthma.

Ratner (8) recently reported eight cases of rabbit hair asthma in children and points to its great practical significance, which has not been heretofore emphasized. Our results in the Children's Clinic (9) of Mt. Sinai Hospital, point to rabbit hair sensitizations as the most common epidermal protein associated with asthma. In every case except one in a series of twenty children studied in the clinic and in private practice, rabbit hair was found in the pillow or mattress upon which the patient slept. Commercially rabbit hair finds an open and ready market because it is inexpensive. Upon personal investigation we were surprised to learn how general is the use of rabbit hair in pillows and mattresses in the poorer homes. Over ninety per cent. of the cheaper grade of furs sold under various names are made of rabbit hair.

A case in illustration is that of a boy, J. R., aged twelve, with onset of asthma at two and a half years, duration of attacks from one to four weeks. After the age of five he began gradually to improve and at the age of eight was entirely free of all attacks. In July, 1921, after an interval of complete freedom from asthma for three and a half years, while in the country he suffered a severe attack when in bed but a short while. The following two weeks he seemed apparently well during the day but coughed and choked during the night, his sleep being very much disturbed. His condition cleared up a few days after his return to the city in August, and he enjoyed apparent health until the early part of January, 1922. Then the cough and wheezing returned, accompanied by slight asthmatic attacks occurring at night but somewhat improved during the day. He was tested against 110 food, epidermal, bacterial and pollen proteins, giving positive reactions to rabbit hair and Streptococcus viridans and doubtful reactions to beef, chicken, strawberry, cheese, celery, and duck feathers. Investigation revealed that the pillow in the country was made of rabbit hair and a recurrence of symptoms was attributable to a pillow, which proved to be made of rabbit hair. On February 7, 1922, this was removed from his room and he has remained well since, except for the few following days while recovering from a simple secondary bronchitis.

POLLEN AS THE CAUSE OF ASTHMA.

The spring and fall type are the two well known groups causing pollen asthma. The spring type is due to the pollen of timothy or red top and in most patients orchard and June grass are also found. Only occasionally does asthma result from exposure to the pollen of trees, shrubs, and flowers. Pollination begins about the middle or end of May and continues to the middle of July.

The fall type of pollen asthma is the most common form. The pollen season commences about the middle of August and terminates toward the latter part of September or until frost appears. The asthma usually begins between August 30th and September 6th, when it is most severe. The pollens causing sensitization are the short and giant ragweed, sunflower, goldenglow, dahlia, and corn. The ragweed is the chief offender.

In both types of pollen asthma, hayfever symptoms start with the onset of pollination. Occasionally pollen asthma is present with practically no nasal or eye symptoms. The fall type causes more intense asthma and protein intoxication. The continuation of asthma after the pollen season is due in most cases to a secondary bronchial infection, often accompanied by a nasal accessory sinus catarrh. Some cases of postseasonal hay asthma cease to have any paroxysms after a few desensitizing injections of the offending pollens. The asthmatic spasms are evidently due to the pollens in question as the exciting factor because improvement or relief is affected after treatment. Sterling (10) believes that patients sensitive to these pollens cannot throw off the protein intoxication when once they come in contact with it, and that state is kept up by some patients throughout the year and in others irregularly throughout the year. The spring type responds to pollen treatment more readily and with better results. The ideal treatment should include all pollens to which a patient is sensitive. In beginning the administration of pollen extract great care should be exercised not to give a dose large enough to break down the patient's initial tolerance. The succeeding doses are rapidly increased and as much pollen injected as can be tolerated, just keeping within the limits of a general reaction.

BACTERIA AS THE CAUSE OF ASTHMA.

In this branch of study much disappointment is generally expressed because most observers report few immediate positive skin reactions and the results from autogenous vaccine treatment have been equally as unsatisfactory. Many observers have entirely discarded the use of bacterial proteins in the routine performance of the skin tests. This is indeed an admission of the apparent uselessness and lack of faith in its employment as an aid in the search for an etiological factor in bronchial asthma. Up to one year ago we were in sympathy with these views.

Sanford (1) reported not a single reaction in 365 tests to Staphylococcus pyogenes aureus and albus.

Walker, Rackermann, Piness, and others, however, have demonstrated the value of employing bacterial protein skin tests in asthma, the results being confirmatory. The protein of Staphylococcus pyogenes aureus is the most frequent cause of bronchial asthma, that of Streptococcus hemolyticus, Staphylococcus pyogenes albus and Streptococcus viridans occur in the order given. Occasionally one finds a patient who is sensitive to the proteins of Micrococci tetragenus, citreus and catarrhalis, to the diphtheroid bacilli, Streptococcus nonhemolyticus and to the pneumococcus. Probably any type of bacterial protein may cause asthma. Goodale (11), who was the first to use bacterial proteins in the skin tests. obtained similar results.

Many patients that came under observation were considered clinically asthmatic bronchitis. These nonsensitive patients were especially studied for delayed bacterial reactions which were observed from six to seventy-two hours after the tests were performed. The type and size of the induration, the time of its first appearance, the period of maximum development and the required time for the reaction to disappear, were factors carefully noted. The induration and erythema is not very much unlike that seen in the von Pirquet reaction and it is classified in a similar manner, that is, from one to four plus. Some of these delayed reactions first described by Walker resembles a mild infection, the pus proven to be sterile. Positive delayed reactions were obtained by repeated testing against bacterial proteins in the nonsensitive and socalled asthmatic bronchitis patients. The great amount of routine work is more than compensated for by the ability to help some of these apparently hopeless sufferers. The results thus far observed are encouraging. The publication and scope of the work is withheld at this time in order that the observations can be properly checked and the results followed over a period of time.

Walker (12) and Rackermann (13) have reported excellent results from vaccine treatment in patients demonstrating an immediate or delayed reaction. Sicard (14) found the streptococci to be the most prevalent in asthmatic sputa and autogenous vaccine treatment yielded very favorable results. Babcock (15), Hutcheson and Budd (16), are strongly in favor of vaccine treatment. Vaccine made from the whole bacterial body of the sensitizing organism as determined by the skin test, is used in the specific treatment of bacterial asthma. The whole bacteria is employed, because the aim is to desensitize as well as immunize against infection with the same organism.

A case in illustration is that of H. C., aged thirty-three, first seen in November, 1919. Occupation, environment and physical examination could not explain the etiology of his attacks. In February, 1919, he contracted an acute bronchitis persisting for two weeks. This was followed by bronchial spasms usually occurring about 4 a. m. daily. A rhinologist referred him with the assurance that there was nothing in the nose or accessory sinuses responsible for the asthma. Four months' treatment by a gastroenterologist, believing that a possible intestinal intoxication was present, resulted in a loss of twenty-five pounds with no improvement in the asthma. For the past six years he has been having three to four headaches weekly which were not relieved by glasses. The history was otherwise negative. Skin tests were performed with over a hundred proteins. The only clue to a possible etiology was a plus-minus reaction to Staphylococcus pyogenes aureus, presenting a wheal three mm. with a faint erythema of one cm. After the fifth injection of a stock Staphylococcus aureus vaccine he began to improve. An accidental increase of a hundred million bacteria administered on December 22, 1919, was followed by severe asthmatic attacks, the patient commenting that they were "worse than ever" and that "it came out of a clear sky." After February, 1920, he was free from headaches and bronchial spasms and was discharged four months later, still free from asthma. He weighed 160 pounds, having gained twenty pounds. After an interval of relief for almost two years, he returned January 8, 1922, complaining that for a month he had slight occasional wheezing. Skin tests to all proteins revealed only delayed reactions of one plus to Staphylococcus aureus and a three plus to Streptococcus hemolyticus. An active bronchitis followed by continuous asthma, set in one month later. A repetition of the bacterial protein skin tests showed similar delayed reactions. His asthma was relieved after the fifth injection of a vaccine containing the organisms to which he was sensitive.

DRUGS AS THE CAUSE OF ASTHMA.

Skin sensitization can be demonstrated on sensitive patients to various drugs, such as quinine, powdered ipecac, and opium.

Peshkin (17) reported a case of true anaphylactic bronchial asthma in a pharmacist due to the inhalation of powdered ipecac, engrafted on a recurrent seasonal bronchitis. In the fall of 1919 he complained of much running of the nose, following by an irritating and distressing dry cough and respiratory oppression. Soon after he experienced for the first time a typical bronchial spasm. These symptoms would come on when he was working in a drug store and especially when compounding powders. Skin tests performed with many drugs in powder form commonly employed during the influenza epidemic were negative, except pulvis ipecacuanhae et opii (Dover's powder), which gave positive reactions. Powdered opium, ipecac, and lactose —the constituents of Dover's powder—were then tried, giving positive reaction only to ipecac, reacting to a one to one hundred thousand dilution. Powdered ipecac was administered internally without ill effects referable to the respiratory system. Inhalation, however, resulted in the immediate return of the usual nasal and respiratory symptoms. This case also emphasizes the importance of making careful inquiry into the occupation of asthmatics.

ANIMAL SERUM IN RELATION TO ASTHMA.

In a large series of patients with asthma few positive reactions to horse serum were found.

Peshkin and Rost (18) determined the incidence of sensitization to horse serum in a series of 477 normal children, between two and fifteen years. All cases reacted negatively except for a plus-minus reaction in a boy, aged three and a half years, whose history as to diphtheria was negative and who had never received an injection of any kind of serum. Eighty children of the series gave a history of being injected with diphtheria antitoxin and all reacted negatively. Four were injected twice as they had the disease twice. Thus the administration of diphtheria antitoxin incurs practically no risk of anaphylaxis. Yet we must not relax in our efforts to make search for a possible sensitization in every patient about to be injected. They cite a case of asthma in a boy, aged fourteen, with a plus-minus reaction to horse serum and who was given a prophylactic dose of one c. c. (one thousand units) diphtheria antitoxin (19). Within fifteen minutes he suffered a severe anaphylactic shock with the symptoms referable to the skin, intestines, and bronchial tubes.

OCCUPATION IN RELATION TO ASTHMA.

Occupation may have a direct relationship to the cause of bronchial asthma. Epidermal protein or dust is almost invariably the offender. Occupation frequently explains the development of sensitization after the age of forty. The following occupations are associated with asthma, although the occurrence is not usual; bakers sensitive to wheat proteins; hostlers sensitive to the protein of horse dandruff; furriers sensitive to rabbit and musk rat hair proteins, and jewel polishers to the dust of boxwood and orangewood. Sensitization to the proteins in medicinal herbs may occur in the workers on the fields. Sensitization is more common to ipecac, a perennial shrub growing in Brazil and other South American States.

Wheat protein as a direct cause of asthma in occupation is responsible for the greater number of sensitizations.

PASSIVE HUMAN ANAPHYLAXIS.

It is of interest to note, since Schloss (20) demonstrated passive anaphylaxis in guineapigs injected with the serum of a sensitized patient, that the danger of induced human anaphylaxis is real.

Ramirez (21) draws attention to the practical importance of this possibility in blood transfusion and reports a case of passive anaphylaxis which was apparently induced by the blood of the donor. In the recipient, hitherto free from any evidence of sensitization, there developed an acute attack of bronchial asthma after the transfusion on being brought in contact with horses. The donor readily admitted being subject to a persistent and long standing asthma and bronchitis. When he was tested he was found to react to horse dander more acutely than did the recipient.

Wolfe (22) reports a case from the maternity service of the Long Island College Hospital, in which definite anaphylactic phenomena were manifested after a blood transfusion; in this instance her son was the donor.

ANTIANAPHYLAXIS.

Schloss (23) first called attention to human antianaphylaxis in four infants, three of whom were sensitive to egg and one to milk. Following the occurrence of symptoms, after the ingestion of a certain quantity of egg or milk, the cutaneous reaction disappeared. After a period varying from twenty-seven to forty-five days, cutaneous sensitiveness returned and symptoms of urticaria were caused by the ingestion of the toxic foods.

A case in the private practice of Dr. W. L. Rost is that of J. S., aged five, with a previous history negative to asthma. She was seized for the first time with a violent anaphylactic shock on January 19, 1921, shortly after the ingestion of a pear. Cyanosis due to bronchial spasm was extreme and death seemed certain. Heroic measures, however, were successful in checking the attack. At intervals up to twenty days after the initial shock reaction to pear was still negative. Subsequent mild asthmatic attacks always followed the ingestion of a small portion of pear. It was unfortunate that the period of induced antianaphylaxis could not definitely be determined in this case.

The practical significance of this occurrence is obvious and must be remembered when performing the skin tests.

SENSITIZATION IN THE NORMAL AND ABNORMAL.

The presence of the symptoms in patients with sensitization informs us that their tolerance to the offending protein is broken down. The initial sensitization occurs long before the symptoms of asthma become manifest. The frequency of sensitization can be approximately determined by referring to a normal series.

In a recent paper Peshkin and Rost (18) determined the incidence and significance of sensitization in 502 children between two and fifteen years; 9,406 tests were performed with seventy-four food and epidermal proteins. There were five positive reactions occurring in three children or one half per cent. of the total number of children. Forty-eight children gave sixty-seven doubtful reactions or nine and one half per cent. of the total number of children tested. Thus ten per cent. of the children show positive and doubtful reactions which decreases as the age increases, indicating progressive desensitization. They show that the incidence of sensitization in normal as compared with abnormal children (5) indicate that the ratios are correct. The foods giving positive and doubtful reactions are frequently indulged in and compose an essential part of the dietary of these children. The foods giving the greatest number of reactions in these normal correspond proportionately with those in the abnormal children. It is maintained that all reactions above the control are true protein sensitizations and should be regarded as potential anaphylactic cases. It is necessary to institute prophylactic measures in normal cases presenting sensitization without symptoms. Time alone can answer in how many of these cases showing sensitization symptoms may develop. One case, however, is cited from the normal series which subsequently developed asthma.

O'Keefe (24) has shown that foreign proteins may pass from the mother to child through her breast milk in sufficient amounts to result in sensitization of the infant. Some of the infants were found sensitive to proteins; they had no history of ever having ingested. The mother in no instance showed sensitization to the protein to which her child reacted. One nursling of six weeks gave a positive reaction to codfish. The child's skin cleared up when the fish was omitted from the maternal diet.

We believe that with the accumulative evidence already at hand, it is fairly safe to assume that most cases of hypersensitiveness has its inception during infancy and childhood. Failure to become naturally desensitized during this period emphasizes the reason why, in the course of time, the threshold tolerance to proteins is passed and symptoms develop.

GENERAL CONSIDERATIONS.

In the face of experience we cannot agree with the prevalent trend of opinion that too delicate or fine a reading of the protein reaction impedes the progress of this branch of medicine. No reaction above the control should be regarded lightly. If proved not to be the offending protein, it is well to bear it in mind as possible sources of future trouble. Patients have been cited presenting multiple positive and doubtful reactions that got well when one or all of the latter were seriously considered as etiological factors. The extreme necessity of further study in sensitive cases is shown by Rackermann (7) in a hundred cases in which the existing positive reactions were evidently incompatible with the history. Subsequent study showed that the findings of the food or animal protein sensitizations were of distinct importance and of use in the further treatment in thirteen per cent. of these cases.

No difficulty should be encountered in determining the relation between the offending protein and symptoms in cases presenting one or several sensitizations. If the administration of the protein causes symptoms or the withdrawal results in partial or complete relief the conclusions will be obvious. Patients with many reactions are often difficult to manage from the viewpoint of treatment and determination of the responsible protein. Multiple sensitization is most commonly observed among patients who begin to have asthma during infancy and it is quite frequent among those patients with beginning asthma during the period of childhood. The rapid cessation of symptoms upon the withdrawal of the offending proteins in uncomplicated cases, while simple, are nevertheless impressive and are most frequently demonstrated in children. A complicating secondary bronchitis often require appropriate vaccine treatment to bring about complete relief. Usually the duration of asthma in children really matters very little, in so far as structual lung changes are concerned. If a slight emphysema is present and the asthma relieved, we can expect the lungs to be restored to normal. If asthma continues into the adult period the longer it is present the more pronounced may be the resultant bronchitis and emphysema. The asthmatic habit may take root and the physiobiochemical equilibrium disturbed to such extent that despite the institution of proper treatment against the primary and secondary causes failure of cure results. Positive reactions in patients with organic changes in whom asthma began after the fourth decade require interpretation. These sensitizations have probably been present for many years and against which the patient has acquired a tolerance, asthma being a secondary manifestation to the existing disease. However, cases are met where the conditions are entirely independent and the removal of or treatment against the offending protein (usually epidermal or dust) clears up the asthma.

We believe that if all cases of bronchial asthma in young adults and especially in children were carefully investigated and the results of treatment observed for a long period of time, the number of sufferers from this distressing malady would greatly decrease.

That a goodly number of asthmatic patients have been benefited and relieved since the advent of practical protein vaccination can not be denied. This new branch of study has taken a definite and permanent place in medicine. Further research will remove many difficulties which are encountered at present.

SUMMARY.

The precutaneous or scratch test is the method of choice and is most commonly employed in demonstrating protein sensitivity.

The incidence of protein sensitization in bronchial asthma reported by Walker (6) strikes a representative average.

Food is the most frequent cause of asthma during infancy. With the onset of asthma after the period of childhood, food plays a minor rôle.

Beginning with childhood, epidermal and dust proteins are the most important of which horse hair and dandruff are the most common offenders. In certain localities, however, rabbit hair found in pillows and mattresses is responsible for a greater number of sensitizations.

Postseasonal pollen asthma is not always due to secondary infection. Protein pollen intoxication is the cause in some cases and treatment with pollen extract clears up the asthma.

Bacterial asthma probably constitutes about half of the patients seen. More general interest and investigation should be encouraged in lieu of the present omission of the bacterial proteins in the skin tests.

The marked variations of the reported percentages of sensitization by different observers depends upon the technic and interpretation of the tests, the preparation and number of proteins used, the locality, environment, occupation, age and nationality of the patient along with the age of onset of asthma.

Occupation may have a direct relationship to the cause of asthma.

The incidence of sensitization in normal as compared with abnormal children indicates that the ratios are correct.

Skin tests against horse serum must be performed in every case of bronchial asthma before the administration of therapeutic sera in spite of the fact that it practically incurs no risk of anaphylaxis.

Antianaphylaxis can be clinically demonstrated in some cases of asthma. The practical importance of this occurrence must be remembered when performing the skin tests.

Human induced passive anaphylaxis is a clinical fact.

To fix the responsibility in paroxysmal dyspnea requires a complete series of cutaneous tests accurately performed and properly interpreted together with a thorough history and physical examination.

I take great pleasure in acknowledging my grateful appreciation to Dr. W. L. Rost, chief of the Children's Clinic of the Mt. Sinai Hospital, who has generously permitted me to utilize the material at his clinic for the study of the many observations and conclusions reported in this paper.

562 West End Avenue.

References will appear in author's reprints.

Fractional Test Meal Method of Rehfuss Versus Single Test Meal of Ewald

By M. GOLOB. M.D.,
New York.

Assistant in Gastrointestinal Diseases, Vanderbilt Clinic, Columbia University, and Department of Gastrointestinal Diseases, the Bronx Hospital.

In its proceedings for conducting a test meal analysis of the stomacn contents, the medical profession is largely divided between the fractional method of Rehfuss and the single test meal of Ewald. And in order to reveal more clearly the merits and demerits of these respective methods, a detailed description will be given of each, together with a brief survey of the salient points in the analysis of gastric chemistry.

The Ewald test breakfast consists of the administration to the patient on an empty stomach of thirty-five grams of white bread or four soda biscuits, and 240 c. c. of weak tea or water, the contents aspirated forty-five minutes after the beginning of the meal. At the completion of the aspiration one or two bulbfuls of air are injected into the stomach to smooth out the rugæ before gentle suction is employed. After a portion of the contents is aspirated the funnel is again connected, two hundred c. c. of water are thoroughly mixed with what remains in the stomach, and the combined contents withdrawn, thus permitting the determination of the total quantity of the contents for physical, chemical, and microscopic study.

The fractional method was first brought to the attention of the medical profession in 1914 when Rehfuss introduced the use of the small tube for a continuous study of the gastric secretion, after a test breakfast conducted over a period of two and a half hours at fifteen minute intervals. The object in removing only a little with each aspiration (say five to ten c. c. of gastric contents) is to avoid that interference with the stimulation of the gastric secretion by the test meal, which is consequent upon larger extractions. Each specimen is titrated with a decinormal solution of sodium hydrate for free hydrochloric acid and total acidity. At the end of the digestive phase of two hours, a test for starch is made with iodine, and if negative indicates that complete emptying of the stomach has taken place; so that further attempts to aspirate would bring up but two or three c. c. of mucus and saliva. If, however, the secretion of the stomach continues, we know that we are bordering on a pathological soil. Crohn and Reiss (1) assert with emphasis that "in the hundreds of cases observed with a functionally normal digestive organ, the stomach empties itself promptly at two hours, and thereafter no further secretion is obtainable. All cases varying from this standard by showing digestive or postdigestive hypersecretion are regarded as suffering from a functional aberration from the normal secretory standard of health."

As to the relative merits of oatmeal gruel and white bread for the purpose of a test meal, it may be pointed out that oatmeal gruel can be administered without removing the tube and that its freedom from lactic acid renders it not unavailable for the lactic acid test; while the use of white bread with the tube removed, permits of the regular stimuli of taste and chewing, thus keeping the secretion as nearly normal as possible.

Of the many tubes on the market I prefer the Rehfuss tube. Its weighted tip makes its descent more easy, and the spaciousness of its slots, equal in aggregate diameter to that of the tube, renders it peculiarly adaptable to the aspiration of a composite sample of the gastric juice, inclusive of mucus and food debris.

The limitations of the Ewald method are apparent. The total quantity of the stomach contents can be determined by the Ewald method only after a definite amount of water has been introduced into the stomach. As the patient has already been subjected to the inconvenience of one aspiration he is generally spared further annoyance and the operator foregoes this part of the procedure, content with having secured a few c. c. of gastric juice for analysis. To continue further the study of the motor function of the stomach, it is necessary to conduct a duration test. This is done by introducing the tube into the stomach three and a half hours after the patient has partaken of a meal consisting of two soft boiled eggs, seventy grams of bread with butter, and a glass of water. The contents of a fasting stomach must then be studied for the purpose of ascertaining if there is continuous secretion or food retardation. And only by the combination of the tests described can the Ewald method secure information as to the motor function of the stomach.

In the fractional method of Rehfuss, both secretion and motor functions of the stomach are ascertained in the one test and at one seance. The test meal is known to leave the normal stomach in from two to two and a half hours; more or less time would signify impaired motility, hypermotility, and hypomotility, respectively.

We know that the hydrochloric acid in the gastric juice during the early phase of digestion manifests an affinity for proteid and basic substances and readily combines with them, as may be detected by titration with a decinormal sodium hydrate solution, and the use of sodium alizarin as an indicator. It is the acid over and above that required for entering into combination with the substances mentioned that concerns us most; namely, the free hydrochloric acid, the medium in which the cell lining the gastric mucosa finds its normal habitat. It is this acid which carries on a normal reflex of pyloric opening, dissociates vegetable cells from one another, and acts as an antiseptic agent in rendering the gastric mucosa free from invading pathogenic microorganisms, besides seeking the union of the proteid and basic substances. And what most engages the attention is, that because this acid appears in the stomach contents after the saturation of all substances which it binds, it may be negative or very low when tested for in the early part of digestion; so that no inference is warranted regarding the deviation from the normal course of a gastric curve unless it is based on a study made from contents aspirated at the height of gastric digestion. Of course, cases may be met where the binding between the secreted hydrochloric acid and the basic and proteid substances is so slight in the early period of digestion, that a test at that time will show the acid in large amount.

In performing gastric analysis information is sought from the viewpoint of both etiology and stomach function. The one is furnished by histopathological, chemical, or bacterial evidence of disease; the other by ascertaining the normal stomach activity regarding its secretory and motor powers—perhaps, as Rehfuss pointed out, the detection of "a normal secretory variation without tangible evidence of pathology." The patient's state of mind is an important factor in the determination of the stomach contents. General apprehension and fear of suffocation on first swallowing the tube may so depress the secretory function of the stomach as to render unreliable any test conducted at the time. It is for this reason that the Ewald method is often so erroneous. The fractional method, with its testing period spread over a longer interval of time, takes little cognizance of this momentary depression of gastric secretion, affords the patient time for his uneasiness to wear off, and thus obtains an acid curve more nearly normal.

Another point requiring emphasis is that not all stomachs have the same emptying time, an orthotonic stomach being able to empty its contents in much less time than an atonic stomach. It is therefore reasonable to assume that this physical difference carries with it also a functional disparity in the secretory activity, and that only by the fractional method can this be detected.

That the secretory output of the stomach can be studied to better advantage by the fractional method is attested by Mohler and Funk (2) who, in their study to investigate the gastric function in early and in advanced cases of tuberculosis, point out the lack of harmony in the reports of various workers, and emphasize the value of fractional estimation because of the possibility of establishing a "secretory curve" as an aid in determining the gastric functions. By this method these writers found in one case a type of a curve representing psychic achylia in which the total acidity ranged from two at fifteen minutes, to five at the end of one hour, with a total absence of free hydrochloric acid and apepsia. Following this period the total and free acidities rapidly rose to forty and thirty-two respectively. This type, if studied by the older methods of gastric analysis, would be interpreted as a case of true achylia gastrica, rather than the pseudoachylia it is known to be.

Douglas Vanderhoof (3) began to employ this method of gastric analysis in 1915, and has since adopted it as a routine procedure. In conclusion he stated that he has been distinctly impressed with the increased information obtained by the fractional test meal examination. Anderson and De Albora (4) in a study of stomach contents in 150 patients, have charted their findings in the normal type, achylia gastrica, reflex type, duodenal ulcer, and gastric ulcer. These authors have stated in their conclusions that the fractional estimation of the gastric contents is "sufficiently practicable" to use as a routine procedure in gastrointestinal disease, notably in duodenal ulcer, achylia gastrica and reflex gastric conditions. It furnishes valuable aid in making a diagnosis, and may often obviate the necessity for a röntgenological study.

Cheney (5) asserts that because of better methods for investigation of gastric contents more information is obtained now than a few years ago. He voices his conviction that the best results are obtained by following the plan described by Rehfuss in his article in *Oxford Medicine,* which includes the examination of the fasting stomach contents as well as of those obtained after the Ewald test meal by half hour extractions. Barker (6), in speaking of the continuous study of the gastric secretion after a test breakfast, remarked that the results are in many instances surprising, and declares it probable that hitherto we have often been deceived as to the secretory activities of the stomach by limiting ourselves to single examinations of stomach contents after the test meal. It is my thought that the varying states of secretion designated by Hemmeter as heterochylia, if studied in the fifteen minute aspirations over the two hour digestive period, would show at one seance a picture of secretory variance beginning with an anacidity, progressing to hypoacidity and terminating finally with a hyperacidity. I do not wish to convey the idea that heterochylia does not exist, but desire to point out that if submitted to a fractional method of study, its ever changing chemical demeanor would be graphically visualized. The beginning of the digestive period would probably be characterized by the transient inhibition of hydrochloric acid concomitant with the aspiration of the test meal; the acid would then gradually ascend the ordinates, as time continued to creep along the abscissa.

Much weight may be given to the conclusion reached by Kopeloff (7), that because gastric curves from the same individual often vary as much from one another as curves of different individuals, single determinations by the Rehfuss method are not sufficient upon which to base valid conclusions, since they do not take into consideration variations within the individual. I agree with these conclusions which may in a measure explain the state of heterochylia referred to above. But here I wish emphatically to state that variance is a salient feature in the Rehfuss method; that excepting in the case of a true achylia, variation is revealed in the construction of a gastric curve, often as already explained, running the full range from achylia to hyperacidity. This feature is conspicuously absent in the single test method. Kopeloff, however, states that a bacteriological study of the stomach, including both the active and resting phases of digestion, is made possible by the fractional method of gastric analysis.

Rehfuss remarks that "while there are some authors, like Bourgot, who consider that the stomach tube has almost no contraindications, there are others who find many conditions which might militate against its use." That there are many who share these misgivings is evident from the numerous methods devised for the study of the gastric secretion without the use of the stomach tube. Leon Minnier's (8) method depends on the principle that catgut dissolves in gastric juice with a rapidity proportionate to the activity of the acid. A pearl of ether is placed in a bag of thin rubber tissue, the sac opening of which is closed with a strand of catgut. The capsule is ingested by the patient during gastric digestion, and on coming in contact with the fluids of the stomach the catgut is dissolved and the capsule bursts. The technic comprises an Ewald test meal and a capsule administered immediately after. The interval between the taking of the capsule and the moment when the patient experiences an eructation of ether, is noted.

When ether eructation takes place before one hour, a diagnosis of hypersecretion is made; between one hour and an hour and a half, normal secretion; after an hour and a half, hyposecretion; no eructation, achlorhydria. The results summarized by this method were as follows:

Diagnosis.	*Interval before bursting.*
Ulcer	Thirty minutes or less.
Hypersecretion	Less than fifty minutes.
Normal secretion	Fifty to sixty minutes.
Hyposecretion	Over sixty minutes.
Cancer	Failure to burst, or bursting after several hours.

The examination is subject entirely to the notice of the patient, which may pass unnoticed. The inconclusiveness of the method is too obvious to need further comment.

Dr. Schlessinger, in 1911, advanced a new method for the determination of the total amount of acid in the stomach by means of the x ray, in such cases of gastric disorders as are unsuitable for the aspiration of stomach contents by the tube. The principle of this test consists in the evolution of carbon dioxide gas arising from the action of a carbonate such as sodium bicarbonate in a stomach that is acid. As a result this will increase the collection of gas in the fundus of the stomach. The procedure requires the ingestion of bismuth cornmeal gruel, and an x ray taken one hour later; after which the patient receives the solution of bicarbonate of soda, and another plate is taken. The marked increase in the space occupied by air as revealed by a comparison of the two pictures forms a basis for the estimation of the acidity of the gastric contents. The following points will be observed, upon instituting this method: Marked discomfort of holding the evolved carbon dioxide, as the patient is requested not to belch. There may be considerable escape of gas through the pylorus, and the small intestine may, as a result, become distended. There may be sudden distention of the stomach, with resulting pressure on the thoracic viscera. Besides exposing the patient to dangers from the x rays, however remote, and involving him in financial expense, the method is cumbersome, and unwieldly for conditions contraindicating the passage of a tube. From the multiplicity of methods devised for the study of the stomach chemistry it may be inferred that none of them are without some limitations; that the methods least objectionable are the two under discussion, and that the one holding distinct superiority is that of Rehfuss.

In going over the literature on this subject, I came across the eleven cases pointed out by Timbal (10) as having been diagnosed as ulcer mainly on the basis of subjective hyperacidity, and in which a test meal analysis (single method) disclosed an absence of free hydrochloric acid and in some cases of combined hydrochloric acid. To this state of achlorhydria, a condition certainly unusual in gastric ulcer, Timbal applied the term paradoxic chemism of gastric ulcer. The author concedes that in certain cases the paradox in the chemism is apparent rather than real, as the height of the hydrochloric acid secretion may be reached long after the hour when the test meal is removed. Admittedly, there are reasons for an absence of hydrochloric acid secretion in the presence of the type of ulcer pointed out by Timbal, namley, the location of an ulcer tending to affect the pneumogastric nerve in a manner conducive to the disappearance of the hydrochloric acid, syphilitic glandular atrophy, chronic inflammation of the gastric mucosa. However, it is reasonable to assume that, if all the eleven cases were studied by the fractional method of estimation, some of them would furnish an illustration of psychic achlorhydria or pseudoachylia one hour after the ingestion of the test meal, only to ascend a plotted curve at the end of one and a half to two hours. The following is a case in point:

Case.—A female, W. R., aged twenty-eight, married, had two children both living and well. Her family history and previous personal history were negative. The patient presented subjective symptoms of gastric hyperacidity, but the physical examination yielded nothing of importance. She was of the mixed habitus, hypersensitive. Pupillary reflexes reacted equally to light and accommodation; knee jerks were equal and active. With a pulse of 60, small pupils, and active salivary glands, it was reasonable to classify her as a vagotonic, and accordingly to expect to find an increased gastric secretion. An analysis of the gastric contents by the single test method on three different occasions gave an absence of hydrochloric acid, and a low total acidity. Thus the subjective or symptom hyperacidity was not substantiated by the objective findings revealed by chemical titration. The patient was placed on a sparing and stimulating diet with large doses of hydrochloric acid, but showed no symptomatic recovery. As she had exhibited marked commotion and struggle in swallowing the tube on each of the three aspirations, I decided to institute in her case the fractional method of estimation. The results obtained are shown in the chart.

Thus, I graphically visualized her stomach acidity: During the first forty-five minutes a psychic or pseudoachylia. As the patient became accustomed to the procedure her apprehension wore off, her spirits grew buoyant, she conversed leisurely with those around her, and the secretory function adjusted itself and gave a plotted curve which portrayed the progress of the gastric secretion over the two hour digestive period. Her treatment was consequently changed to a diet with a rich binding affinity for hydrochloric acid and proper medication, resulting in total arrest of her symptoms. I am here reminded of the emphatic words of Dr. Carman: "No other organ in the human body has been accused of so many disorders which it never had as has the stomach. It has been judged guilty and sentenced to treatment when it was perfectly innocent."

CONCLUSIONS.

1. The fractional estimation of the stomach chemistry by the procedure of Rehfuss is a clinical method of proved value, whereby both motor and secretory activities may be studied during all their phases of digestion.

2. The fortitude and cooperation of the patient can be secured much sooner with the seemingly more elaborate method, than with the single test meal.

3. The single examination is inadequate, and many erroneous interpretations of the secretory activities of the stomach have arisen because of inferences based upon such examination.

4. The ordinary stomach tube does not completely remove the gastric contents. It is objectionable to the patient, causes considerable gagging and swallowing of mucus, cannot be retained in the stomach with any degree of comfort for any length of time, and cannot be left *in situ* until completion of gastric digestion.

5. The single test method of Ewald should more properly be called the single phase method. In contradistinction, the fractional estimation of Rehfuss may be termed the comprehensive method.

6. As aptly put by Best, "the advantages of these curves in its superiority over the older 'one sample test' are comparable to the advantages of the moving picture over a single snapshot."

544 West 150th Street.

References will appear in the author's reprints

The Gallbladder Surgically Considered

By HARRY COHEN, M.D.,
New York,
Attending Surgeon, People's Hospital.

The treatment of the infected gallbladder has of recent years been the subject of considerable discussion between the internist and the surgeon. Each has set forth the assertions for his contention and each have shown merit. In this paper the surgical aspects of the disease will be shown preference.

CLASSIFICATION.

Included under the broad heading of gallbladder diseases are cholelithiasis, cholecystitis, pericholecystitis, inflammations of the ducts and vessels, surgical liver complications, and carcinoma. Several surgical conditions are omitted from discussion owing to their relative infrequency. Among these are echinococcus cysts, worms, and amebic abscesses.

ETIOLOGY.

Cholelithiasis is a prevalent condition; gallstones being found in ten per cent. of all adult autopsies and in this large number of cases, ninety-five per cent. give rise to no symptmos. In the remaining five per cent. the symptoms range from a slight to a rapidly fatal peritonitis (1). The enumeration of the etiological factors are omitted here since they are well known or may be found in any textbook.

The most constant symptom is pain in the gallbladder region. The acute colic pains radiating to the back and right shoulder are pathognomonic. Tenderness and rigidity over the gallbladder region are indicative of inflammation which is usually present in five per cent. of the cases and are therefore valuable signs. Fever may be present for the same reason. The socalled intermittent hepatic fever, or Charcot's fever, is present only in severe cholangitis or with a stone in the common duct.

DIAGNOSIS.

The diagnosis of cholelithiasis is of importance. Unfortunately the röntgenogram is not only not of help, but frequently a source of error. With the help at present of the Bucky-Potter diaphragm more cases are being diagnosed. A high estimate for positive findings by the x ray is forty per cent. Much has also been expected of the duodenal tube and bucket as an aid to diagnosis in these cases. A large number of otherwise unrecognized cases have thus been discovered. The use of the duodenal tube and bucket is made in two ways; first by the aspiration of the duodenal contents, with the examination of such contents for bile, blood and pus, and secondly the appearance of the tube under the x ray, especially the presence of marked irregularity in the contour of the duodenum, indicating adhesions. Another means of diagnosis that has been made use of recently to good advantage is the blood chemistry examination, especially the cholesterin content. A high cholesterin content may indicate the presence of stones. From a surgical point of view the most important means of making a diagnosis has been the old fashioned clinical method of palpation. Palpation reveals two things, tenderness and rigidity, both of which may be very mild. An explanation of this lies in the fact of an associated cholecystitis. In those cases where the stones lie dormant and present no or indefinite symptoms, this means of examination will likewise be of little value. A thorough history is important. Symptoms of recurring pain or colic in the right upper quadrant with tenderness and rigidity even though slight in patients with antecedent typhoid fever, or in women following pregnancy or in the proverbial, "fat, fair and forty" establishes the diagnosis of cholecystitis. In these cases the x ray findings help to eliminate a pyloric or kidney condition. Moderate fever or in the severe cases the intermittent fever always means coexisting cholecystitis. Jaundice especially where these clinical findings are present is a positive sign of gallbladder disease.

PATHOLOGY.

Stones may be present in the gallbladder without a cholecystitis; more often a cholecystitis is present. The gallbladder may be slightly thickened or the mucous membrane may be reddened. The gallbladder may be the seat of an inflammation varying in degree from slight to severe without any stones being present.

Case I.—Y. S., aged forty, was admitted to the People's Hospital, April 15, 1917. There were symptoms of acute cholecystitis. At operation acute cholecystitis was found but no stones. Cholecystectomy was done with no return of symptoms.

Stones in the fundus usually produce no symptoms. Stones in the cystic duct are the cause of colic, especially when they attempt to emerge from the duct. The cystic duct may be occluded by stones within or by a growth from without. A single stone occluding the cystic duct frequently is the cause of a gangrenous gallbladder. The inflamed gallbladder may be normal in size, or it may be very large. In one of my patients it extended below the umbilicus. The walls may be very thick or about one inch in thickness. It may also be gangrenous.

Case II.—S. H., aged forty-two, was admitted to the People's Hospital, May 30, 1919. The patient had a fifteen year history of gallstones. The present history, one week's duration of the trouble with acute pain. At operation a very large gangrenous gallbladder with acute pericholecystitis was found. In the enormously dilated cystic duct there were two large stones occluding the lumen.

The contents, besides stones, may be normal bile, turbid bile, mucopus or pus.

Case III.—H. R., aged forty-two, male, was admitted to the People's Hospital, January 1, 1920. There was a history of gallbladder attacks for a year. For one week the pain was severe, with fever, pain, tenderness and rigidity in the gallbladder region. On operation the gallbladder was found gangrenous filled with bile and pus and many stones. The cystic duct distended. Cystectomy with drainage was followed by an uneventful recovery.

In cases of hydrops the secretion is serous or mucoid and contains no bile.

Case IV.—M. W., admitted to the People's Hospital, June 30, 1920. The patient had a six year gallbladder history. At operation a hydrops of the gallbladder was found with the cystic duct firmly occluded by a single stone. The gallbladder was markedly distended; no adhesions. The gallbladder was filled with a thick mucus, there was no bile. A cystectomy was followed by an uneventful recovery.

In cases with several attacks or secondary to a gangrenous gallbladder or hydrops, the gallbladder may shrink up so that when this region is explored at the time of operation, the gallbladder may not be found or may be fibrous.

Case V.—E. D., aged seventeen, admitted to the People's Hospital, June 27, 1919. The patient was operated upon by me one year previously for an acute catarrhal appendicitis. During the past year he had several attacks of cholecystitis. On admission to the hospital the patient suffered with a severe attack which required one week to subside. X ray showed a small solitary stone the size of a pea. At operation the typical small shrunken, shrivelled up gallbladder was found, also a small calcareous round stone occluding the cystic duct. Cystectomy was followed by an uneventful recovery. There has been no recurrence of the symptoms since.

A frequent pathological condition and the cause of many symptoms are gallbladder adhesions uniting the organ to the surrounding viscera especially the duodenum and pylorus.

Case VI.—I. G., aged thirty-seven, male, admitted to the People's Hospital, February 26, 1921. There was a history of gallstone attacks for nine years. During the past week an acute cholecystitis had developed. At operation an acute cholecystitis was found with the bladder full of stones. The bladder was very firmly adherent to all the surrounding viscera including the stomach, duodenum, omentum and abdominal wall. The adhesions were separated, a cystectomy was followed by an uneventful recovery.

Cancer is occasionally primary but most frequently secondary in the gallbladder and ducts. In one of my cases it was secondary to a stomach cancer. Of surgical interest in this condition is the fact that where primary, there is an associated history of gallstones in a hundred per cent. of the cases. The chief symptoms are jaundice and slight pain. The gallbladder is usually distended and palpable which tends to differentiate this condition from obstructive jaundice in which case the gallbladder is small. This is the substance of Courvoisier's Law.

A stone after escaping from the cystic duct may locate itself in any part of the common duct. The two favorite places are the middle of the duct and the ampulla of Vater. In these cases the common duct may enlarge to the thickness of a thumb. A stone in the ampulla may give intermittent symptoms acting in a ball valve way. An infrequent location for stones is in the hepatic ducts or occasionally even in the liver. A gangrenous gallbladder may rupture into the peritoneal cavity.

A suppurative gallbladder may do likewise, but more frequently may rupture and cause a localized abscess between the gallbladder and the liver, or may rupture into the liver and cause a liver abscess. An abscess of this kind is usually large and single. Pylephlebitis or infection of the portal vein is a late complication and almost always fatal. In several cases the diagnosis was confirmed by the examination of the blood count. In these cases the white cell count shows a marked leucopenia in the neighborhood of 4,000, at a time when the temperature may be very high. This condition of leucopenia has not been described to my knowledge, or if it has I have not seen it. The final stage of this condition may be described as multiple abscesses of the liver. These abscesses vary in size from miliary to a very large size and may number in the thousands. In one such case a large septic thrombus was found in the portal vein. In these cases the spleen is usually enlarged.

Nephritis is a frequent complication especially in the severe forms of gallbladder infection. Likewise myocarditis. In several cases of jaundice operated upon by me, I had no difficulty with the control of the bleeding. I have found that hemorrhage in these cases is more feared than encountered. In none of my cases was there an associated diabetes present.

INDICATIONS FOR MEDICAL TREATMENT.

The majority of cases with indefinite symptoms are medical, also where the diagnosis is in doubt, jaundice excepted, and where the attacks of colic are few and far between. Postoperatively every patient should be placed under the care of an internist, since the underlying cause of gallstones still remains and only the end results are relieved by operation.

INDICATIONS FOR SURGICAL INTERVENTION.

The one symptom that causes the patient to seek surgical relief is colic. Next follow constant pain, acute inflammation and obstructive jaundice. In cancer a palliative operation as a cholecystenterostomy or occasionally an excision of a small growth may afford relief. In solitary abscess of the liver, drainage frequently is successful. In pylephlebitis and in multiple liver abscesses, surgical drainage of the gallbladder may afford temporary relief. The prognosis in these cases is grave with or without operation.

POSTOPERATIVE COMPLICATIONS.

As in all operations hemorrhage and shock are to be considered. However, these complications are rarely encountered in uncomplicated cases and in the severer or complicated ones can be avoided with proper precautions. Care in the ligation of the cystic artery will take care of the hemorrhage. Pneumonia is also a complication, but not a frequent one. It developed in one of my patients. Recovery took place in that case. Late complications are recurrent stones, methods for the prevention of which I do not know. This is one of the reasons that these patients should be treated postoperatively by the internist. In one of the cases where I operated on the patient there developed recurrent stones four years after operation. In one patient there developed stones with urgent symptoms sixteen years after an operation. Infection of the wound occasionally results in a wound hernia which can easily be remedied by a subsequent repair operation.

ASSOCIATED PATHOLOGICAL CONDITIONS.

1. *Appendicitis.*—In the majority of gallbladders removed unless a distinct contraindication existed, the appendix was excised. In a large number these appendices were found to be the seat of chronic inflammation with adhesions, narrowing of the lumen and other evidences of pathological changes.

2. *Pyloric ulcer.*—

Case VII.—B. G., aged twenty-eight, admitted to People's Hospital, July 20, 1916. There was a three year's history of ulcer of pylorus and of cholelithiasis. X ray showed an ulcer of the pylorus. Cholecystectomy was done for a bladder full of stones and gastroenterostomy was also done. There was an uneventful recovery and the condition of the patient today is normal.

3. *Epigastric hernia and hemorrhoids.*—

Case VIII.—J. K., aged fifty-two, male, admitted to People's Hospital, October 16, 1916, suffering with cholecystitis with stones, epigastric hernia, and hemorrhoids. Operative procedures were performed for the relief of these, which were followed by an uneventful recovery.

4. *Referred symptoms.*—These occur in two groups; where the symptoms are referred to the appendix and where they are vague and indefinite. Of the former group I performed two cholecystectomies in patients in each of whom appendectomies had been performed within a year. In each the symptoms were unabated until the true diagnosis was made and operative intervention instituted. It is interesting to note that in each of these the x ray helped in the final diagnosis. In the second group one of my patients complained of symptoms referable to the ovarian region.

5. *Cholelithiasis and associated gynecological conditions.*—Fibromyoma of the uterus.

Case IX.—M. C., aged forty, was admitted to People's Hospital, September 12, 1916. She complained of gallstone colic and metrorrhagia. On examination besides gallstones she had a large fibromyoma of the uterus. It was a question from which she suffered more, but after a cholecystectomy for the stones, a hysterectomy was performed at the same time as her condition warranted it. The recovery was uneventful.

6. *Cholelithiasis and pregnancy.*—In several attacks of colic have increased in severity and frequency during pregnancy and have subsided after delivery. There are many explanations for this, the two chief being mechanical and chemical. In only one did the symptoms become so severe that operation had to be performed.

Case X.—B. S., aged thirty-two, admitted to People's Hospital, July 13, 1919, with a history of gallstones for three years. The patient was four and a half months pregnant. The increasing severity of the attacks necessitated the operation of cholecystectomy. The pregnancy was not interfered with. There was an uneventful recovery with subsequent normal full term delivery.

Jaundice.—This symptom may be caused entirely by a medical condition in the liver, however, one should bear in mind that it is just as frequently or perhaps more so an indication of a surgical disease. The surgical causes of jaundice are obstruction of the ducts or duodenum, stricture or pressure from without as tumors. Catarrhal jaundice is the chief disease requiring a differential diagnosis. This usually is present in the young and either presents no symptoms or those of gastroduodenitis. This is a distinctly medical disease. Acute yellow atrophy of the liver is rarely confounded with obstructive jaundice. Jaundice may be so faint as to barely be noticeable or the color may be dark green. The onset may be acute or gradual. In obstructive it is acute, the color being intensified with each attack of pain. The pulse is slow and usually there is no fever. Fever means infection and assumes one of the two types described previously. Chills usually accompany this intermittent fever.

Rupture of the gallbladder.—Fortunately although the seat of acute and frequently severe inflammation, the gallbladder rarely ruptures. Occasionally it does. And then it may rupture into the peritoneal cavity and cause a general peritonitis, or it may rupture into the liver and cause either an abscess between the gallbladder and the liver or a liver abscess. Although neither of these conditions are necessarily always fatal, the prognosis is poor.

Cases of septic cholangitis; septic pylephlebitis; multiple abscesses in the liver; stones in gallbladder and duct may occur.

PROGNOSIS.

The prognosis for the uncomplicated cases of cholecystitis and cholelithiasis is about the same as for uncomplicated appendicitis. The mortality is minimum. The prognosis appears less favorable as preoperative complications develop. But even in these cases the prognosis is excellent. The only conditions in which the prognosis is grave, are in cancer and in liver abscesses. In male patients the pathology seems to be more severe, likewise the morbidity. The prognosis, however, is the same.

CONCLUSIONS.

I feel that gallstones, when the diagnosis is positively established, is a surgical disease, requiring surgical intervention. Subsequent medical care is essential. Cases with indefinite symptoms require medical care. Early diagnosis and early operation may prevent the more severe complication as gangrene, empyeme of gallbladder, rupture with liver abscess and even cancer. In two of the cases of jaundice operated by me a diagnosis of carcinoma had been made, yet neither had a cancer and both made excellent recoveries.

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221 Second Avenue.

An Aseptic Local Anesthesia as Applied to the Anal Region: With Especial Reference to Anesthetic Composition*

By EDWARD G. MARTIN, M.D.,

Detroit, Michigan,

Proctologist, Detroit Receiving Hospital; Associate Proctologist, Harper Hospital; Associate Professor of Proctology, Detroit College of Medicine and Surgery.

It is my desire to avoid reference to the many technics of securing local anesthesia in the anal area with the exception of stating that they have been criticised for lack of asepsis, for failure in many instances to produce complete anesthesia, for a lack of speed in its production, and for the distortion of the surgical field by distention.

I wish to describe briefly a perfected technic that in my experience has proved its worth, soundness of principle, and superiority over any other local anesthesia technic that I have used, witnessed, or found described in the literature. It has seemed to meet the objections to local anesthesia from every viewpoint.

At New Orleans during the meeting of the American Medical Association in 1920, I described as a part of my essay (1) a local technic, which in principle corresponds to the earlier history of the more perfected method which was developed during the following year, and which has been used in my clinic at Detroit Receiving Hospital during the past year, in over 150 cases, with entire satisfaction.

Following a preliminary hypodermic injection of one sixth grain morphine and one two hundredth grain hyocine hydrobromide, given one hour prior to operation, and repeated at the half hour—the patient assumes a right lateral prone position with the knees flexed and the body rotated sufficiently for convenient exposure of the anal field; following any approved cleansing preparation, an area about one and a half inches posterior to the anus is freshly iodized by the operator himself and nothing is allowed to touch this spot until the anesthesia is complete, except the sterile, two and a half inch, twenty gauge standard hypodermic needle. This needle, attached to any type of syringe, one, two, or three ounce capacity, is plunged through the sterile iodized area where the injection is commenced and continued, pushing the needle on past the anus laterally and superficially, injecting without distending nor distorting the area, a slight elevation ahead of the needle being sufficient; the injection is carried well into the anterior commissure; the needle is then withdrawn, and the procedure is repeated on the opposite side. The skin at the site of puncture will be found elastic enough so that these lateral injections can be carried on past the anus in a straight line, as illustrated photographically. Again, nearly withdrawing the needle, the deep nerve areas in and around the sphincter are thoroughly injected on each side, the needle being carried deeply at two or three angles into both lateral deep areas; the test of insufficient anesthesia being any slight complaint of pain during the later part of the deep injection. From one and a half to four ounces of anesthetic solution with an average of two, have by this time been infiltrated throughout the area, absolutely without distention, and when skillfully injected, has required from one

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*Read before Annual Meeting of the American Proctological Society, St. Louis, Mo., May 23, 1922.

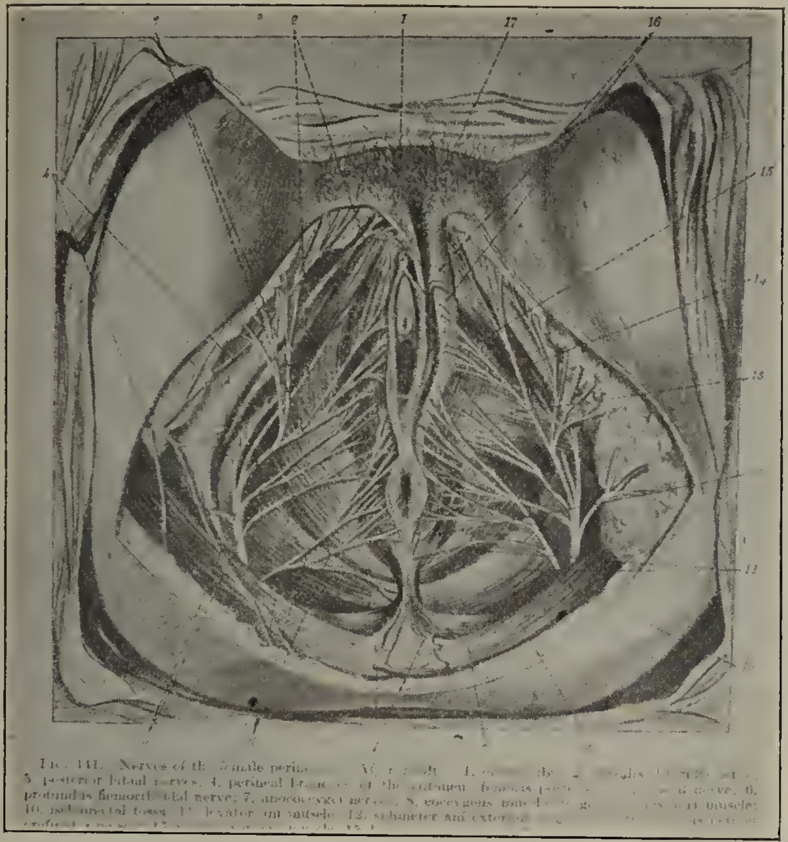

Fig. 1.—Illustrating distribution nerves involved in this anaesthesia.

and a half to two minutes only. The field is now presented for any type of operation desired in the whole anal and perianal area, with anesthesia complete and profound immediately at the end of the two minutes' injection.

The composition of the anesthetic solution is of

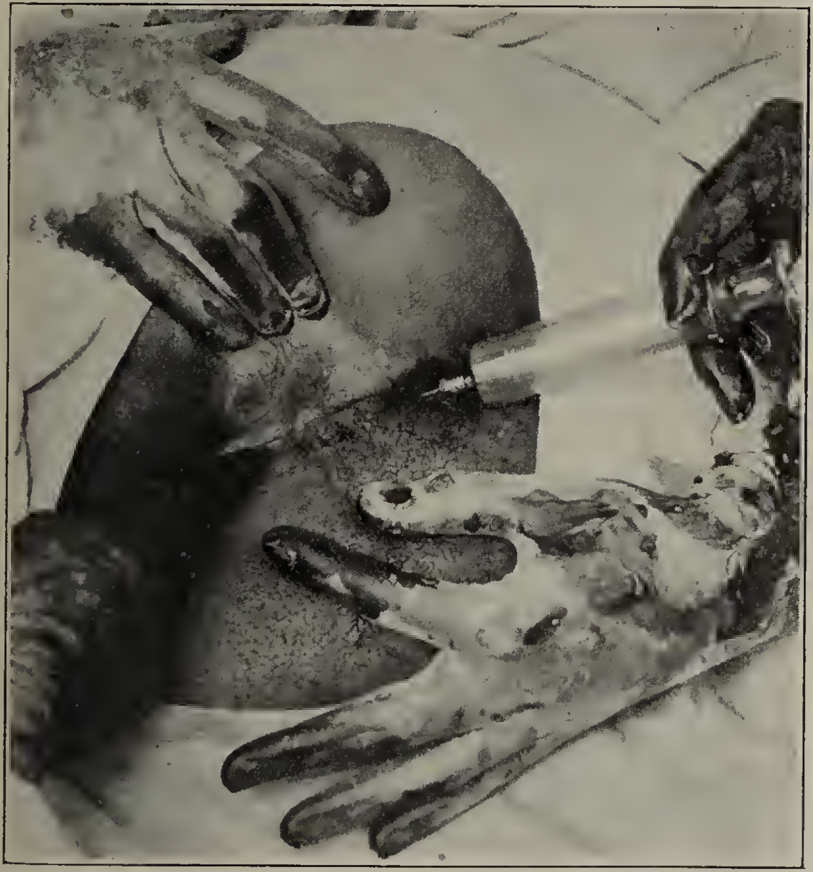

Fig. 2.—Injection having been made through iodized spot, being carried past the anus well into the anterior commisure; finger indicating its progress and length of needle.

interest and importance. Up to 1920 I had tried and discarded several anesthetics, and was using one per cent. procaine (novocaine)—both with and without the addition of adrenalin; this solution was fairly satisfactory, but did not always produce profound anesthesia without distorting the field, and was lacking in the desired rapidity of action; however it proved to be more active when one per cent. adrenalin was added. I tried in short series different combinations, for a time adding mercurochrome as an antiseptic and color agent, but discarded it as ineffectual and unnecessary as an antiseptic.

Years ago it was occasionally the practice to spray the nose with antipyrin solution before applying cocaine; thus suggested, I added antipyrin to the solution, and secured more immediate and pronounced anesthesia. Since then I never have experienced difficulty with the anesthesia lessening during the operation, and am unable to say just how long it does last.

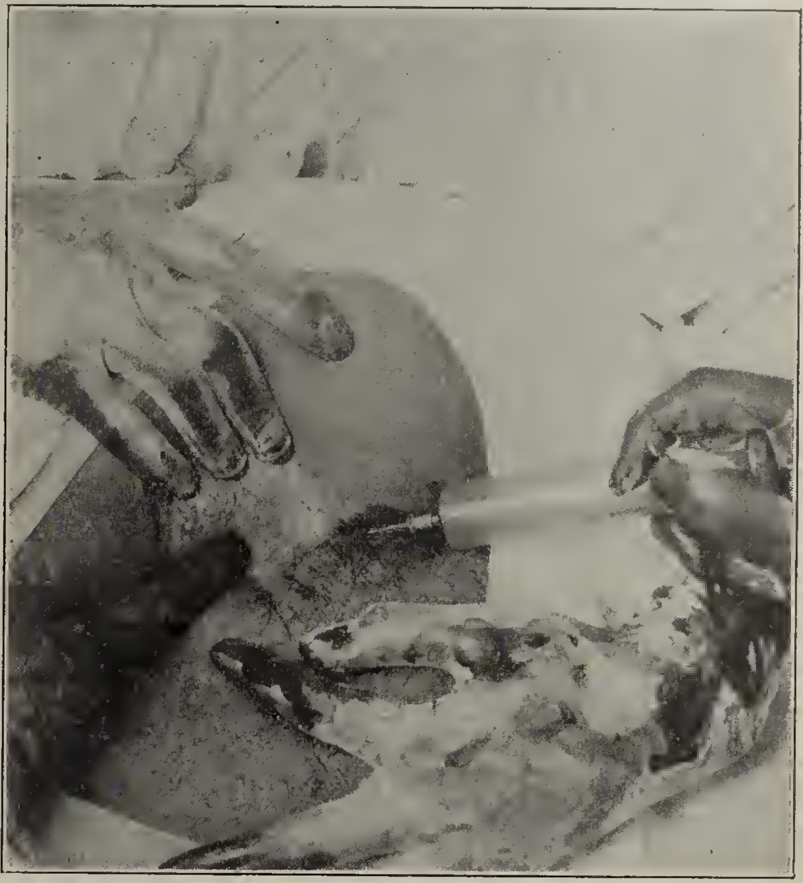

Fig. 3.—Same injection being carried past the anus on opposite side.

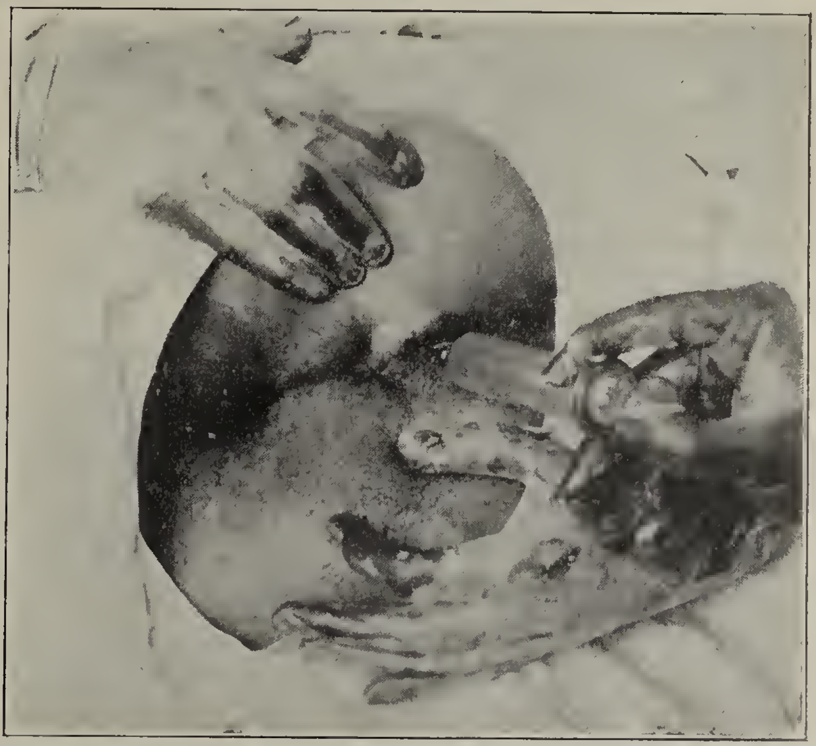

Fig. 4.—Deep injection being made at several angles 2½ inches deep.

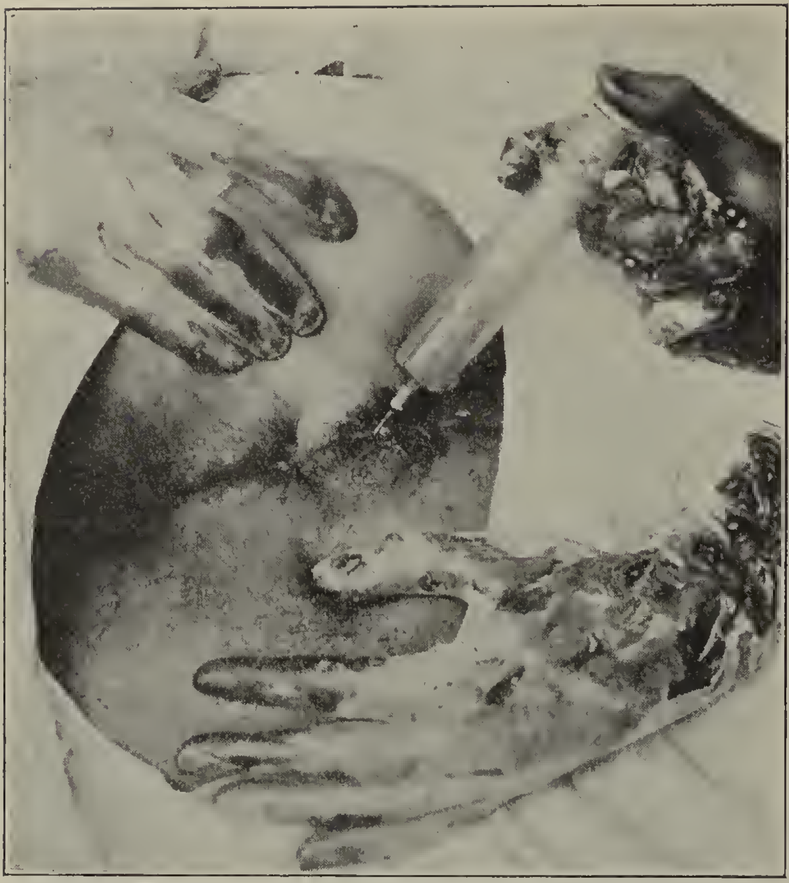

Fig. 5.—Deep injection being carried out on opposite side.

In this series I have used procaine (novocaine), two per cent; adrenalin solution (1 to 1,000), one per cent.; and antipyrin, one per cent. This solution is just tinged with some color medium, such as methylin blue or a red color, to differentiate it from any other prepared solution—(cocaine and procaine have a dangerous similarity of sound). I repeat, in other words: I have been injecting from fifteen to forty grains of procaine (novocaine), ten to twenty grains of antipyrin, and from ten to twenty drops of adrenalin solution (1 to 1,000), in the production of each anesthesia.

It is possible to attain anesthesia following this nerve block, with a weaker solution of procaine (novocaine) if speed and dependability are somewhat sacrificed, but I have found no reason after using two per cent. in this series, for lessening its strength. There is but occasionally confusion on the part of the patient which may last from ten to twenty minutes following injection; this should cause no alarm and requires no treatment.

Two cases exhibited tetanic convulsive movements, lasting about five seconds; there were no other symptoms and no treatment was required; one was an alcoholic, and one a delicate and anemic young woman. No untoward experience, and no toxicities, other than mentioned have been met with.

SUMMARY.

This technic as described offers asepsis, speed, safety, and satisfactory anesthesia, without distorting the surgical field. It offers evidence that procaine (novocaine) is safe when used, even in a great quantities and in stronger solutions than has been the usual custom. It suggests that there has been and still prevails the necessity for constant effort to improve socalled old and tried methods.

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1447 David Whitney Building.

Thoracic Abdominal Gate

By JOHN J. RECTENWALD, M.D.,
Pittsburgh, Pa.

The object of the instrument is to make a gate or trapdoor for the pleura, lung, stomach, liver, colon, cecum, ovaries, uterus and bladder. By means of this instrument the thorax and abdomen can be opened and closed at will and treatments may be made over an extended period of time without repeated incisions.

The instrument (Fig. 1) is hinged so that it can be introduced through a rather small opening in the chest or abdomen. It is a small shoulder at the base to prevent the inside door from falling into the cavity. It rests inside the abdominal wall with the tube portion extending out of the abdomen about one and three quarter inches. Its flat base is the internal plate for the chest or abdomen.

The external plate, as shown in Fig. 2, screws down on the outer side of the tubing of Fig. 1, in order to accommodate the different thicknesses of the chest or abdomen.

The internal gate of the instrument (Fig. 3) is made of aluminum, so that radium can be applied while it is in place, or the radium can be placed outside the instrument within the cavity and the cavity closed with a door, as shown in Fig. 3, or Fig. 4. The instrument has a thin arm extending across its diameter, which makes introduction and removal easy. It is made to extend a few millimetres beyond the level of the internal plate, so that there will be less bulging into the lumen of the instrument after removal, thus facilitating the closing of the incision after the instrument is no longer required.

The external gate (Fig. 4) is made to lock with a slight turn into the plate (Fig. 1) and so arranged the slipping of the dressing. Movements of the patient will not open the instrument, and the patient himself is unable to open it. To keep the parts of the instrument which are shown in Fig. 3 in place, gauze is packed into the lumen of the tube.

With this instrument it will be possible to have a good sized opening leading to the pleura, lung and all abdominal organs, allowing for x rays and various forms of light to penetrate into diseased areas, especially for the application of radium and frequent instrumentations. The instrument may be modified by various forms of tubal extensions, to fit the inside plate. The interior of the stomach, cecum and espe-

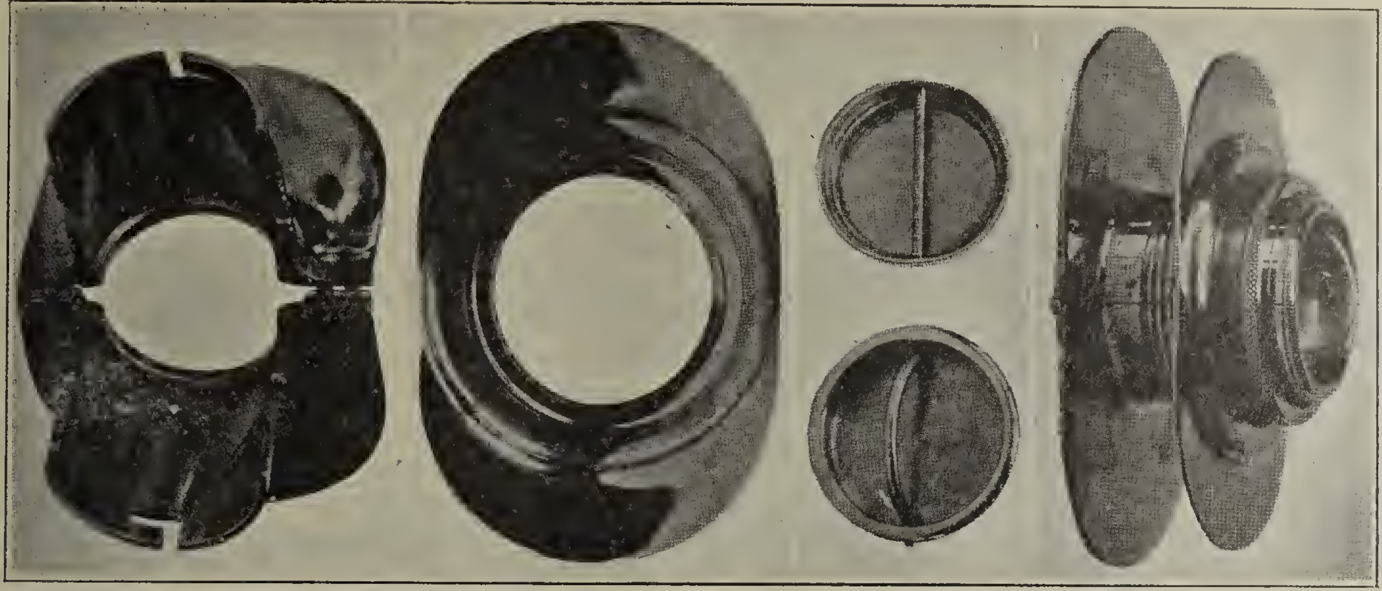

FIG. 1—Various assembled and separate parts of the thoracic abdominal gate.

cially the bladder can be treated at intervals over an extended period of time, the doors being opened and closed at will.

It seems to me that the indications for such an instrument are many. The conception of the instrument was brought about by my desire of applying radium directly to cancer of the stomach in the form of needles, tubes or plates over an extended period of time and avoiding repeated incisions.

139 BROWNSVILLE ROAD.

The Dawn of Surgery

The Ritual Mutilations of Primitive Magic and Circumcision

By JONATHAN WRIGHT, M. D.,
Pleasantville, N. Y.

Wherever we attempt to get back to the beginnings of medicine we find it emerging from under the shield of religion. When man arose to an erect posture, when he came from his cave, he himself took refuge beneath it and with him all sorts of good and evil fled thither, pity, altruism, lust, ambition, all were huddled beneath the panoply which the superstition, the fear, the awe of primitive man before the Great Unknown erected. So if we see surgery creeping out we very naturally look for the marks stamped on it by sacerdotalism and the rituals of magic. They are rather ghastly. Fingers short of their joints, arms stiff with pointing to Heaven, cuts and gashes, scarifications, castrations, circumcisions, things thrust through loops of skin, noses and lips and ears pierced and distorted, we scarcely know thereby whether God is honored or the beauty of woman and the dignity of man are enhanced, so are awe and love and vanity, the cruelty and hate of black magic, the fraud and superchery of man, his selfsacrifice and his selfishness, intertwined as they come out from under their shelter, the shield of the goddess we saw harboring the snakes of the divine Apollo, the sanctuary which shielded criminals and patriots, enemies and friends from pursuers. Religion was the sheet anchor of nascent civilization. Close to this chaos we first find surgery at the beginning of history.

It was not otherwise with prehistoric man. In the depths of his cave where man seldom penetrated, and daylight never, among the magic of his art we see the imprints of the human hand from which one or more fingers or perhaps some of their joints are missing. Archeologists have concluded it is to be accounted for by the supposition that they amputated digits then as a part of the ritual of magic just as they do now, or but lately, among the Australians (1) and the American Indians. Osborn (2) too speaks of it as noted among the traces of prehistoric man, but it has been recorded not only by observers among the North American Indians (3), not only in Australia and America but in another isolated continent, Africa, among the South African bushmen (4), strange, inexplicable furrows traced in the mind of man as he leaves his cave. Teeth are not only broken off or filed for ornamental purposes, but dentistry was carried to astonishing limits, apparently for adornments. Perhaps they had no decaying teeth where they showed, but holes were bored in the sound ones that did show and stopped with gold or shining minerals (5), and this we have not yet traced to magic sources.

With very many of the rituals of magic among primitive men, which have their own affiliation with the birth of surgery, we cannot linger, but it will be interesting, I hope, to spend more time with circumcision and yet a very inadequate space is at my disposal here to tell the whole story of it at the dawn of surgery. It comes to us out of the mists of the past, through the lowest grades of culture, through the high civilizations of the east, but we can only speak of it in Egypt. It was checked by the rise of the Christian hatred of the Jews, but finally came back to us, as this subsided, more or less directly

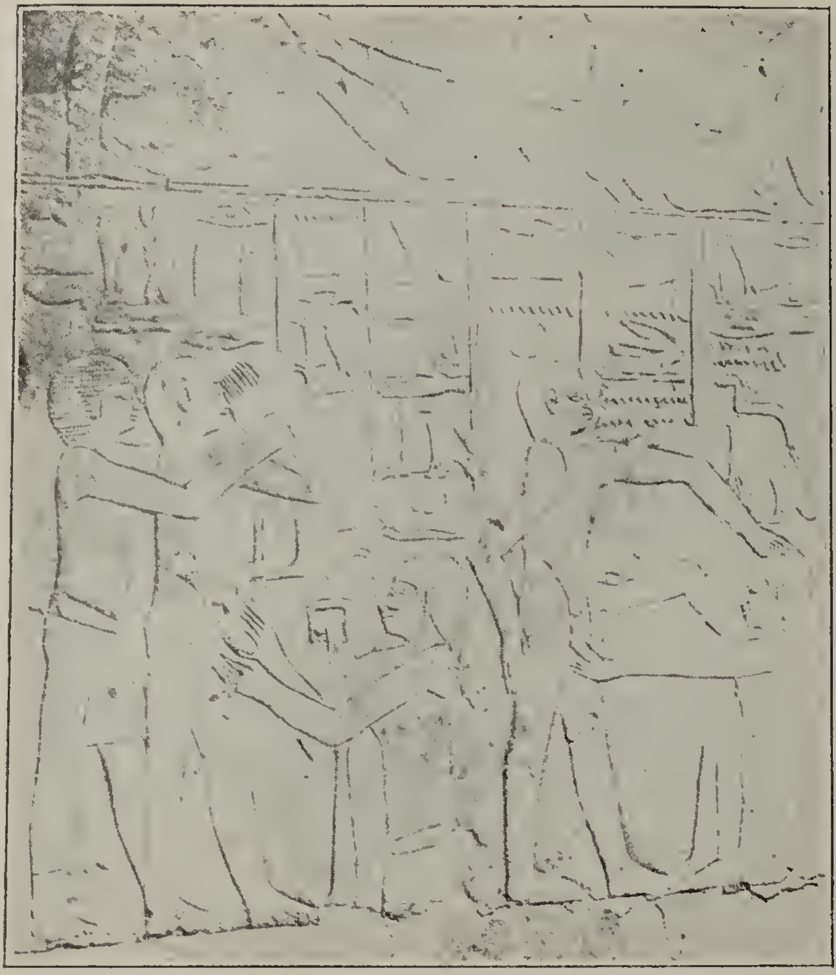

Fig. 1.—From an Egyptian tomb painting at Sapparah of the 6th Dynasty about 3500 B. C. (circumcision).

from the laws of Moses and, to top out the long story, it has reached its climax in our time and has become almost as profitable and a much safer operation than appendectomy and tonsillectomy. But if circumcision had no history while early Christian fanaticism reigned supreme we will find it quite as fruitless to go over the vastly more important epoch in the history of medicine—the era of the Greek civilization. The Greeks turned in disgust from the mutilation of the living body in any form and no race shrank in such horror from the mutilation of the dead. The Hebrews required their priesthood to be physically without spot or blemish, but they, like all Orientals, chopped and hewed the laymen into unrecognizable remnants of living men. The Asiatic Greeks were tolerant of castration and it was a part of the religion of the Syrian goddess, engrafted on their race in hither Asia, but the western Greeks would have none of it.

In a consideration of the surgery of primitive men we plunge at once into our subject and form a valid bond with the interest of the last article on the cutting instruments of the earliest surgery. In almost every Australian tribe studied by Spencer and Gillen there was "a tradition of certain persons who first introduced the stone knife for use in circumcision in place of the firestick, which previously had often caused the deaths of young men at initiation" (6). The use of stone knives in circumcision is noticed in the *Bible* (Ex. V. 25, Joshua V. 2) and it has been very properly inferred (7) that the rite began with the Jews when the tribes were in the stone age and this has persisted in the Jewish ceremony until comparatively recent times. It is widely practised in Africa, especially among the western tribes (8) and "all the Bechuana and Caffre tribes south of the Zambesi practise circumcision" (9). In Brough Smyth's book (10) it is stated that the rite of circumcision is practised among the natives of various parts of Australia, but Ratzel (11) says it is so universal that it is an insult to call a man uncircumcised. Smyth supposed it to have been introduced by the Malays. It is practised in the islands of the south seas in the Pacific (12), but in America it was known to the Aztecs (13) and is still practised by the Caribs of the Orinoco and the Tacunas of the Amazon.

I desire only to go far enough into the literature of this part of the subject to reveal how widespread the custom was and is still among savage tribes in all parts of the world, just as we found the less puzzling custom of prehistoric man as to finger joint amputation, but I desire to make some mention, in connection with the subject, of the remarkable operation of subincision of the urethra which obtains among Australian natives or did obtain when the white men found them and began their extermination. Of what is called the mika operation, Spencer and Gillen say (14): "It is the most extraordinary practice and one which it might be thought would be frequently attended with serious results, but none such apparently ever follow." The operation is performed with a sharp chipped piece of flint or a small knife made of a hand flaked quartzite. The amount of blood lost is at times very large, but nothing is done to stop it and it seems "to cease when the pressure applied by the hand to open out the subincision is removed." Lumholz (15) says a native intimated to him that it was done because they didn't want too many children crying around the camp. However, observation has shown it has little or no effect in this way and apparently it dates back to a time when the natives did not know the reason for impregnation and the nature of the coition of the sexes. Spencer and Gillen (16) say the Arunta tribe have no notion of the origin of the practice and as in this and other tribes the custom is immemorial and applied to all males, there is no foundation for the belief it is a birth control device.

Still it might be commended to the consideration of some of the gentlemen interested in the modern advocacy of the latter. In the tribes in Australia where subincision is practised, the vulva is incised in females so the hymen is divided and Roth thinks perhaps the two rituals have some common origin, but mutilation of the genitals is found under different forms elsewhere. In the Malay Archipelago the clitoris prepuce in females is removed and in East Africa the mons veneris and the labia majora. Among the Israelites of Ethiopia, according to Mérab (18), not only is circumcision performed on male children but on female children as well in the ablation of the clitoris and the labia minora.

Neolithic man in Abyssinia was circumcised according to the testimony recorded on the most ancient of the green slate palettes (19). Herodotus, then, is quite in accord with modern archeological evidence when he says: "The Phoenicians and the Syrians in Palestine acknowledge that they learned the custom of circumcision from the Egyptians . . . but of the Egyptians and Ethiopians, I am unable to say which learned it from the other for it is evidently a very ancient custom" (20). Nor does he venture any hypotheses as to how the remarkable custom arose. The mummified bodies prove that it was general at all periods in Egypt (21). If it had a religious or magical origin, as it probably had, there has been nothing advanced to make it plain what fundamental primitive idea could have been so universal as to initiate its practice in the infancy of the world in such widely separated areas as South America, Asia, Africa, not to mention prehistoric Europe.

Johnston thinks circumcision penetrated into Africa from Egypt, as we know from Herodotus many things probably did, but in view of the testimony referred to as shown in the figures on the slate objects one fails to see how this can be supported, and the inscriptions celebrating the victories of Merenptah (1258 B. C.) of the nineteenth dynasty and describing the slain refer to the Libyans as uncircumcised (22). From the evidence supplied in regard to the Nubians by the desiccated bodies examined at Naga-ed-der there is reason to suppose that in predynastic times it was customary to circumcise the males at the age of puberty. No evidence of a corresponding mutilation of girls, the ablation of the clitoris, was forthcoming though it might have escaped observation. Smith, however, asserts that there was no ablation of the labia minora, a practice not unknown among modern primitive tribes. At Karnak in a little temple devoted to the cult of Chonsu, one of the gods of medicine, there was found a bas relief which represents the operation of circumcision as it was performed in the eighteenth and nineteenth dynasties. The operator with a pointed instrument in his left hand is on his knees excising the prepuce of a child who is standing before him. Behind the child is a woman holding his wrists, and there is another child standing by awaiting his turn and in the background another woman ready to assist (23). The knife was regularly of stone like the one with which Joshua was ordered to circumcise the Israelites in the desert around Sinai, not far from Egypt.

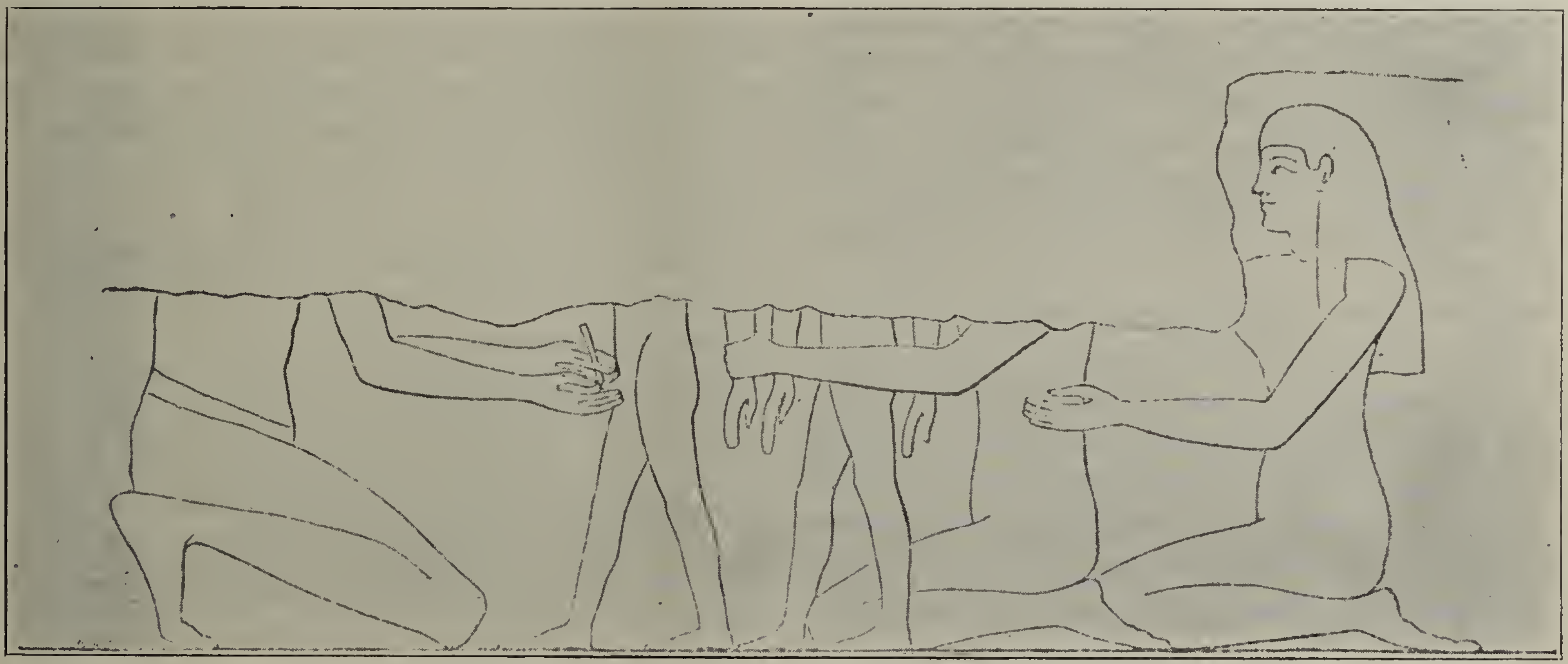

FIG. 2.—An Egyptian operation (circumcision) about 3,000 years ago.

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Editorial Articles

JUST LIKE FOLKS

Faults of digestion are the commonest causes of acute diseases and faulty foods the source of most structural defects. In other words, ignorance of food and feeding or wilful ignoring of what we know on the subject is at the bottom of the vast majority of human ills which have a physical origin.

We are so used to these digestive and nutritional disturbances that we take them almost as a matter of course, and consider them as a part of the curse of Adam. Wild animals in the wild are but little subject to disease of such origin, but we look upon these as belonging to a different sphere. The experience of managers of zoological gardens does not bear out this "different-from-them" notion. Studies in the Vienna Institute of Anatomy show that privately kept monkeys, as a rule, died from diseases of the digestive organs, while even the zoo must have its dispensary stocked with bismuth, soda mint tablets, pepsin, etc.

Animals which perforce adopt man's diet, and method of living generally, come to grief, and suffer from the same ills as their illustrious host. This clearly shows that the human animal (which is but a day out of the jungle) is in no way peculiarly prone to nutritive diseases, but is disordered in proportion as his food and feeding are inappropriate. He has simply made a colossal failure along this line. The ignorance of dietetics, by not only the laity but the profession, and the dire results therefrom, is appalling. Within the last month we have heard from the lips of a woman, a college graduate, "I find it is hard to keep babies after you get them. I lost my first one because I did not know how to feed it and I had a fool doctor who could not tell me how," and from another mother, also a college woman, "We know now that our little boy would be alive if we had not given him the wrong kind of food." Experience is a sad and expensive teacher and what doth it profit a woman to have spent four years getting a B. S. and then to have the agony of losing a child because she did not know what and when it should eat?

It is to be hoped that our colleges are beginning to pay some attention to hygiene as well as to Latin and French, ancient history and trigonometry, and that medical schools will some time lay as much stress on dietetics as on pharmacology. A more intimate conception of the facts of evolution needs to be taught, and, in particular, our extremely close relationship in time, as well as in physical character, to our simian friends, for it is all too evident that we can learn much more from them than they from us as to methods of healthy living. We had better begin our studies at once and in earnest. We are finding out how to feed and how not to feed other animals, why not turn the information to further account and apply it to ourselves? The problems are nearly identical and the human being is presumably as valuable as any inhabitant of the barnyard or of the zoo.

SILICOSIS

From time to time the country is shocked by reports of explosions or other disasters in mines entailing a considerable loss of life, but the toll of premature deaths and of years of incapacity produced through the insidious development of anthracosis in this and allied industries is of far more serious moment.

All kinds of inorganic dust are capable of producing fibrosis of the lungs, but silicious dust is by far the most dangerous. Nor is the presence of the tubercle bacillus at all necessary to render such dust injurious. Neither is silicosis a disease that comes on only after years of work in the dust. According to Middleton (*Journal of Industrial Hygiene*, March, 1921), symptoms of silicosis may appear after only six weeks of exposure under bad conditions.

It has been thought that silicious dust was especially injurious to the lungs because of its hardness and the angularity of its particles. Collis has recently put forward a new theory, that silica is injurious on account of its chemical nature—that a foreign substance is harmful in proportion as it is alien to the material of which the body is composed. This theory has been advanced partly for the reason that other kinds of dusts, especially that from coal, is not so injurious to the lung, the collier being relatively free from anthracosis and miner's phthisis. The intravenous injection of a solution of silica into rabbits is said to result in fibrosis of the liver, enlargement of the spleen and changes in the kidney resembling interstitial nephritis but such experiments do not, of course, necessarily prove that silica dust deposited in the lungs produces its effects chemically.

The latest word on the subject is from Mavrogordato, a worker in the South African Institute for Medical Research. He believes that the solubility and chemical activity of diet, e. g., silica, is of great importance; hardness and sharpness are of but little importance. It is not the particle that penetrates the tissues, it is the tissues that take up the particles and intracellular particles are always in phagocytic cells, or in tissues that may be derived from phagocytic cells. In the case of silica dust the cells, after clustering together at various points, remain fixed with their burdens, posibly becoming mummified by silica as eggs are preserved through the action of water glass. "Coal, and the same is true of clay, seems to set up a sort of aseptic catarrh," in which there is a steady exodus of the phagocytes with their ingested particles from the lung.

Three groups of experimental animals were exposed, one to silica alone, a second to a similar amount of silica followed by coal dust, and a third to a similar amount of silica dust preceded by coal. After six months the autopsies showed that in the first group the lungs were grey, in the second they were black, while in the third they were white. Coal dust apparently "sets up a condition in the lung which is inimical to the fixation of silica." Although this is most significant, Mavrogordato does not believe that the protective action of coal dust "is the whole story of the freedom of the collier from miners' phthisis." "It is quite likely that the coal helps them to deal with the small amount of stone dust that they actually inhale, but he believes that better ventilation in coal mines has been the chief factor in the reduction of phthisis."

Some astonishing results in health have been achieved by reducing the dust in metaliferous mines through the application of water and it is believed that conditions will be made still safer by the invention of special ventilating apparatus. In many factories in this country, where men are exposed to large amounts of silicious dust from grinding wheels, the employers are indifferent and the means of prevention of silicosis which might be used are neglected.

BRITISH INSTITUTE OF INDUSTRIAL PSYCHOLOGY.

That the application of psychology to industry has resulted in advantage to the working man has been proved. That it has proved also of benefit to employers is not so generally recognized. That this also is a fact is definitely established in a recent report of the National Institute of Industrial Psychology of Great Britain, wherein it is stated that the Institute has of late received, in the form of subscriptions from manufacturers, sums aggregating nearly ten thousand dollars for the support of its work.

The following outline of the Institute's activities is quoted: 1. The study of the requisites of commercial and industrial occupations, and the development and use of appropriate tests in order to secure, *a,* in cooperation with commerce and industry, a more scientific selection of employees, and, *b,* in cooperation with schools, more dependable vocational guidance for children. 2. The investigation of the most desirable methods for the application of the workers' energies in offices and factories, with particular reference to, *a,* the avoidance of useless motions; *b,* the best arrangement of rest periods; *c,* the decrease of monotony and the arousing of greater interest. 3. The discovery and verification of conditions which make for the well-being of the workers and the most favorable relations between them and the management in regard to pay methods, employees' representation. 4. The study of the various factors which influence the sale of commodities, for instance, designing and advertising. 5. Providing, *a,* lectures for employers and employees, and, *b,* courses of training for foremen, managers, welfare workers and investigators. 6. The stimulation and correlation of research in industrial psychology and physiology throughout Great Britain, and the publication in practical form of the facts determined by such investigations.

ALCOHOLIC PSYCHOSES AND PROHIBITION

A statistical study of alcoholic psychoses among admissions to institutions for mental disease during recent years is contributed to the October number of *Mental Hygiene* by Dr. Horatio M. Pollock, Statistician of the New York State Hospital Commission. Some of the significant facts revealed by this study are here summarized.

In 1910, cases of alcoholic psychosis amounted to 10.1 per cent. of all patients with mental disease admitted to institutions. The annual rate of admission of alcoholic cases was 6.7 per 100,000 of the general population. Patients with this form of mental disease constituted 12.4 per cent. of admissions from urban districts, and 6.4 per cent. from rural districts. The rate per 100,000 of population in urban communities was 10.7 and in rural, 2.6. Of the male admissions to hospitals for mental disease in this same year, 15.3 per cent. had alcoholic psychoses; of the female admissions, 3.4 per cent. The rates per 100,000 population were 11.0 and 2.0 respectively.

A marked decline in alcoholic first admissions took place in 1914, increasing in 1915. In 1917 there was a decided reaction, alcoholic cases in that year exceeding those in 1913. Throughout 1918, 1919 and 1920, the number of these cases decreased rapidly, reaching its lowest figure in 1920. In 1921 male cases increased again, but female cases continued to decrease. It was found that the rate of first admissions suffering from alcoholic psychoses is closely correlated with the per capita consumption of liquors. This conclusion is demonstrated by a comparison of the index numbers computed from official reports for the years 1909 to 1920. These figures for New York State are paralleled by data from the State records of Massachusetts. A table giving figures as to the intemperate use of alcohol among first admissions to the New York civil state hospitals during the period 1909-1921 inclusive shows a gradual decline in the excessive use of alcohol, which "constitutes good evidence that a marked change in the habits of the general population with respect to the use of alcohol had been taking place for several years prior to the enactment of the Volstead Law. The change began before the World War, but was halted by the reaction of 1917. Later it was accelerated by wartime restrictions." Tables compiled by the Statistical Department of the National Committee for Mental Hygiene giving the latest available data on this subject are quoted. Among other significant facts, these data show that only 3.1 per cent of first admissions to state hospitals in 1921 were cases of alcoholic psychoses, indicating, when compared with figures from the Federal Census of 1910, a marked general decline in alcoholic insanity. It is shown also that the rate of admissions with alcoholic psychoses in the State tabulated was only 1.9 per 100,000 population, as compared with 6.7 for the whole country in 1910. During 1920, the first year under prohibition, there were fewer alcoholic admissions to state hospitals than in 1921. This reaction, it is stated may be due to lax enforcement of liquor laws, or partly to economic depression.

An interesting excerpt is made from the report of Miss Cora Frances Stoddard entitled, Wet and Dry Years in a Decade of Massachusetts Public Records. Miss Stoddard writes: "The women have apparently gained more than the men under prohibition, perhaps because they are less exposed to the bootleggers' blandishments, and are less likely to seek out the tribe. At all events, the average number of women in all penal institutions of Massachusetts on September 30, 1920 and 1921, the two dry years, was the lowest of the decade, sixty per cent. smaller than the wet years' average, while the total prison population on this date had dropped fifty-two per cent. A decrease of practically one half in the number of commitments to the State Reformatory for Women in the two prohibition years carries a stage farther the story, not only of the passing of alcoholic women from penal institutions, but also of other women offenders."

Another significant fact brought out by Doctor Pollock's study is that alcoholic psychoses have been much more prevalent in urban than in rural districts. In 1910 admissions from urban districts constituted 77.8 per cent of all the alcoholic admissions in the United States, and, since that year, the proportion has increased. A study of first admissions to the New York civil state hospitals from July 1, 1915, to June 30, 1920, showed that 90.9 per cent. of the alcoholic first admissions were from urban districts. The average annual rate was 3.7 for urban districts, and 1.6 for rural districts per 100,000 population. A study of several states from 1919-1921 shows that in 1921 the urban proportion was 84.4 per cent, as compared with 83.9 in 1920 and 85.6 in 1919; and the rural proportion in 1921 was 15.6 per cent. as compared with 16.1 in 1920 and 14.4 in 1919.

Doctor Pollack's conclusions are as follows: "1, Marked reduction in the prevalence of alcoholic psychoses throughout the United States has taken place since 1910. This is due partly to restrictions on the liquor traffic, and partly to changes in the habits of the people; 2, The lowest rate of first admissions with alcoholic psychoses occurred in 1920; a reaction occurred in 1921; 3, The rate of alcoholic first admissions is closely correlated with the per capita consumption of liquors; 4, The reduction in the of alcoholic psychoses has been relatively greater among women than among men; 5, Admissions with alcoholic psychoses come principally from urban districts."

WORKING TOWARD POSITIVE HEALTH

"Health is something positive, progressive, dynamic. It is not merely a vague and negative state of being which remains after active illness has subsided. It stabilizes and enriches life, and no effort is too great that helps to win it. This is the positive ideal of health which the Women's Foundation for Health undertakes to teach." Such a proclamation introduces the foreword of a valuable set of six pamphlets, entitled the *Positive Health Series*, prepared and issued by the above foundation in cooperation with the Council of Health and Public Instruction of the American Medical Association, and the Bureau of Social Education of the National Board of the Young Women's Christian Association.

The Women's Foundation for Health is an incorporated organization whose aim is to correlate the health activities of fifteen national women's organizations into a program of positive health. This set of pamphlets is the response to a demand for a common text to be used and distributed by the foundation. The aim is to bring to the individual woman the conviction that a state of health is only normal, and able to be attained. "The program of health education strives, first of all, to persuade her to assume a personal responsibility for achieving her own physical best. The great public health movement of our day needs to be supplemented by this type of education which calls upon the individual to awake and take her own part—because no one else conceivably can take it. While recognizing society's responsibility for securing sanitary and economic conditions favorable to individual well being, the foundation regards the attainment of health in the last analysis as a matter of personal and social obligation; there is an overwhelming tendency today to consider environment as the dominant force in life, but the individual who acquiesces too far in such a point of view does so at her own moral and physical cost. The false satisfaction that comes from blaming circumstances is a poor substitute for the genuine satisfaction which arises from realizing health. It is always possible to add health to one's life—there are always latent stores at hand for progressive health building. The open sesame to these stores is the sincere resolution of the individual to be a better, finer, more efficient being than she momentarily is."

Although we may be inclined to consider as rather extreme, certainly for some cases, these two last dictums, nevertheless the general attitude and work as a whole of the foundation and its cooperating associations are praiseworthy and give promise of beneficial results. Emphasis is placed upon the periodical health inventory as the basis of progressive health building, but this examination must be more than a merely informative survey; it must be dynamic; it must not only equip the individual with full knowledge of herself and her resources, but must also test her will to health by charging her to carry on.

UNITED HOSPITAL FUND REPORT

Noteworthy gains in efficiency, in scope of work, in numbers treated, and in reduction of cost of treatment are recorded in the recently issued annual report of the United Hospital Fund, comprising fifty-eight nonmunicipal institutions. According to this report, patients are now able to leave the hospitals five days earlier than would have been possible under similar conditions ten years ago. This means a twenty-five per cent. increase in the capacity of the hospitals, and a twenty-five per cent. reduction in the expense of treating each patient. The shortening of the length of time required for treatment has been a steady one and has amounted to about a half day a year. Probably the chief cause of this drop is the marked improvement in facilities for diagnosis and treatment. Other causes are the more frequent consultations of the staff, leading to a better understanding of the individual cases; improved convalescent care, making an earlier discharge safe for the patient; better dispensaries and closer cooperation with them, making it possible for patients to become, with equally beneficial results, ambulatory cases in dispensaries, and so vacate the hospital beds, and development of the work of the social service department, with great advantage to both patient and physician.

The proportion of private patients in these hospitals is less than one fourth. "Few realize," says the report, "what a large contribution is made to the hospitals by their medical and surgical staffs. It is only from private patients that the doctors are allowed to accept a fee. . . . This means that the doctors and surgeons treat seventy-six of every hundred patients without charge."

One of the chief features of the past year was the establishment of the Hospital Information Bureau at the suggestion of the Public Health Committee of the Academy of Medicine. It has supplied to hospital officials information about practices, procedures and costs, has studied administrative efficiency in various institutitions, and has amassed a large amount of data valuable to all connected with or interested in hospital work.

The report strongly endorses the work of Doctor Copeland as Health Commissioner, and quotes him as follows: "Were it not for the beds in the privately endowed institutions of this city, our condition would be beyond words. As I view it, there is every reason why these hospitals must be supported so abundantly that they can provide the expensive instruments, the mechanical appliances, the laboratories, the libraries, and all the accessories to modern and proper medical care. I know I speak for the Mayor and for his associates in the Administration when I say that the city itself is back of the movement to assist the United Hospital Fund."

SPHYGMOMANOMETERS.

Accurate work can be done, even by careful workers, only with accurate instruments. This applies to the taking of blood pressures as to other procedures, for sphygmomanometers have their failings, especially the later and more complicated instruments. By actual test, some machines of the ancroid type have been found to vary as much as six millimeters from a correct reading when the instrument was new, and some instruments, after prolonged service and especially after abuse by being used as tack hammers, have shown wider deviations from the truth. With clean mercury and clean glass, the old U shaped mercury machine was correct to within a millimeter or two, but the new mercury machines which do away largely with the fluctuations of the metal, unless carefully made and calibrated, may not be accurate. Fortunately, a variation of a few millimeters either way from the correct pressure is of little moment in ordinary physical tests, though, in life insurance examinations, it may be of considerable importance to the examined. If one wishes to do accurate work, he should have his sphygmomanometer tested and certified and retested at intervals.

HOSPITAL FIRE LOSSES

The National Board of Fire Underwriters report that, during the years 1919 and 1920, fires to the number of 870 occurred in buildings classified as hospitals, asylums and sanatoriums, an average of more than one fire a day throughout the two years. The Board estimates that the hospital property destroyed by these fires amounted to $1,738,954. The opinion is expressed that it is probably no exaggeration to say that ten times this loss in any other occupancy would scarcely have as serious possibilities in endangering life.

The records show that hospital insurance was rarely adequate in these cases, and the deficits had to be made up, in the case of state and city institutions, by the taxpayers, and through appeals to charity in the case of private institutions. It is the opinion of the Board that, estimating that approximately 10,000 hospitals and institutions in this country accommodate, year in and year out, about a million people, the amount of money wasted in replacing such buildings would be sufficient to put a number of institutions now suffering from insufficient endowment firmly on their feet.

Although a five year period is the minimum of time allowed by the underwriters in determining the socalled characteristic hazard, hence a two-year period is hardly long enough for a definite conclusion as to the most frequent cause of such fires, yet the report discloses the fact that the greatest amount of damage from any single cause of the twenty-two listed was sparks on roofs.

The board recommends the use of all hospital buildings of noninflammable shingles or metal roofing, and frequent inspection by expert fire prevention engineers of all chimneys, flues, stoves, furnaces and electrical systems and apparatus. For institutions located in rural districts, even more stringent protective measures are necessary. "The importance of the design and the location of exits cannot be over-emphasized," says the report. "So far as is practicable, only exits of the horizontal type should be provided. In designing exits for hospital purposes, consideration must be given to the possibility of removing helpless patients under fire conditions; horizontal exits leading to outside covered ramps, having grades such as to permit the wheeling or carrying of patients, provide maximum safety for helpless inmates housed above the first story. Such ramps should be wide enough to afford simultaneous egress and ingress. While large floor areas are conducive to economic operation of hospitals, it should be realized that they greatly increase the fire hazard. In general, areas should be restricted as far as is consistent with economic operation, and cut off by standard parapetted firewalls having all openings protected in the approved manner." The report closes with recommendations for strict enforcement of rules prohibiting smoking and the careless or overabundant storage of volatile liquids used in hospital work. Electrical apparatus should receive its current from a circuit distinct from the regular service lines. Provision should be made for adequate and carefully supervised fire prevention apparatus and equipment, and alarm systems and fire drills should be inaugurated.

MUNICIPAL HEALTH CENTRES.

So many of the larger cities of the country are about to establish health centres, or have already done so, that an article on this subject in a recent issue of the *Monthly Bulletin* of the Health Department of Boston is of timely interest. Among cities, other than New York, possessing health units, Philadelphia and St. Louis head the list as having the largest number—ten. In Philadelphia experiments are to be inaugurated in city owned property, and centres have already been established in three story, rented buildings in congested districts and on business streets. St. Louis has ten buildings, leased and equipped by the city. Cleveland and Buffalo come next with seven centres each. Buffalo has one of these in connection with the City Hospital, and another in connection with the public baths and the library. Chicago reports eight municipal tuberculosis dispensaries, quartered in new buildings, and Milwaukee has fourteen child welfare clinics, and is contemplating the erection of a special building for health centre and other municipal purposes. Washington has eight welfare stations conducted by the Child Welfare Society. Cincinnati has one general health centre, and Baltimore one and a day nursery.

The Boston health unit at 17 Blossom Street is suggested as a good, practical example of the type of building suitable for this purpose, with the understanding that each centre must be planned according to the demands of the section of the city in which it is located. The active medical and nursing associations at present doing work in various sections of Boston as parts of the health unit are the Boston Health Department, the Instructive District Nursing Association, the Baby Hygiene Association, the Boston Sanatorium for Consumptives, and the Boston Dispensary. To these must be added the various relief associations which render assistance to the poor and are necessarily closely allied to those alleviating diseases.

CHILD TRAINING FOR MOTHERS AND TEACHERS.

The increasing realization that educational methods of the present are sadly deficient and in many respects actually pernicious is creating a widespread interest in what can be done to remedy conditions. In some instances steps have already been taken toward the formulation and establishment of programs of endeavor along these lines by various institutions and organizations, and by individuals who feel that the chief hope for this demoralized world of ours lies in the clear thinking of the coming generation. Toward this end a comparatively new institution, the National Kindergarten and Elementary College, of Chicago, is working. The young women who attend this college work with the children themselves, not with barren pedagogic theory alone. The earliest grades are those of the prekindergarten or nursery age. This department of the school is conducted according to a modification of the English nursery schools, established for years in that country and recognizedly successful in caring for children of two or three, who must otherwise be left by working mothers to the mercies of small brothers or sisters, or to an already overbusy neighbor mother. In the kindergarten and elementary courses of the college, instruction is given in psychology applied to children, in playground and recreation work, care and hygiene of the child, educational method and procedure, as well as in the recognized academic subjects. The principal aim of the college, and that toward which all the work is directed, is to discover the individual and special ability or abilities of a child and to develop these in the most practical and constructive manner possible, so that the child may start life without that handicap of so many of the children of the past and even of today—a careless and defective school training.

VOCATIONAL GUIDANCE IN ALSACE AND LORRAINE.

Assisted by and at the instigation of employment offices, employers' and workers' organizations, chambers of commerce, school physicians and others, the Strassburg Chamber of Crafts has organized in Alsace and Lorraine a regional vocational guidance service, according to the *International Labor Review*, published in Geneva. Parents and children still attending school are urged to come to this service for advice, with the result that within the sixteen months between February, 1921, and June, 1922, sixty per cent. of the children about to leave school applied to the vocational guidance centre. The school is required to report concerning each apprentice the subject he likes best, the subject he dislikes most, statements as to his attention and memory, and the kind of mental work he has done and how he has done it. A medical report from the school doctor is required, giving the results of a detailed medical examination of each applicant, and the physician is also required to give his opinion as to whether or not the child should take up the occupation he wishes to follow. A psychological examination tests the child's senses. The vocational adviser then consults a file of monographs prepared by the Strassburg office from data furnished by industrial associations and indicating the qualities necessary to becoming a high grade workman in the various occupations. The advantages and disadvantages of the various occupations in regard to different temperaments are also discussed in the monographs, as well as the best age to start, the duration of the apprenticeship, the supply and demand, the compensation and chances for advancement. The vocational adviser must also consult the market before making his recommendation in order to acquaint himself with conditions of oversupply and shortage. Upon receiving a certificate from the adviser, stating that the prospective apprentice has the requisites for success in a given occupation, the young person calls at the regional employment office, which proceeds to try to locate him in a firm where he may serve his apprenticeship.

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News Items.

Harvey Lecture.—Dr. Béla Schick, Professor of Pediatrics, University of Vienna, will deliver the fifth Harvey Society Lecture at the New York Academy of Medicine on Saturday evening, January 27, 1923. His subject will be The Prevention of Diphtheria.

Bronx Hospital.—At the regular meeting of the Medical Board of the Bronx Hospital and Dispensary held on December 28, 1922, Dr. William J. Robinson and Dr. Martin Rehling were reelected president and secretary respectively of the medical board for the twelfth successive year.

Heliotherapy Course.—Dr. Rollier will repeat the course on Heliotherapy usually given in summer at Leysin, Switzerland, January 16 to 21, 1923. This course is conducted by Dr. Rollier and his colleagues free of charge for the medical profession and was described in full in the *Journal of the British Medical Association*, October 21, 1922.

Fourth Harvey Lecture.—The fourth Harvey Society Lecture which was to have been delivered at the New York Academy of Medicine, Saturday evening, January 13, 1923, by Dr. William T. Bovie, assistant professor of biophysics, Harvard University, on The Physiological Effects of Light Rays, has been postponed until January 20th.

The American Medical Association Convention.—Will be held at San Francisco, Cal., June 25 to 29, 1923. The subcommittee appointed by the secretaries of the medical societies of the Eastern States have arranged a twenty-five day tour to San Francisco and return, stopping at interesting and important points. In order to make this tour a success it will be necessary to have at least 125 members subscribe to the tour. The State medical societies of the Eastern States and of some of the Middle States have appointed the following subcommittee to arrange for the tour: Dr. Edward Livingston Hunt, Dr. Wilbur Ward, and Dr. Malcolm C. Rose. The committee extend to all who contemplate attending the convention a cordial invitation to join the tour, communications to be addressed to Edward Livingston Hunt, M. D., secretary, Medical Society of the State of New York, 17 West Forty-third Street, New York.

LONDON LETTER.

(From our own correspondent.)

LONDON, *December 10, 1922.*

INSANITY AND THE LAW.

What is the definition of insanity? On the satisfactory answer to this question depends any amendment it may be found possible to make in the British criminal law relating to the position of insanity. Such was the general trend of discussion which took place at a meeting of the Hunterian Society in London a few evenings ago when Dr. Porter Phillips, the resident physician and Superintendent of the Bethlem Royal Hospital for the Insane, one of the largest, oldest and quite the best known in this country, read a paper on "The Position of Insanity in Criminal Law." Dr. Phillips argued that the law regarding criminal responsibility was unsatisfactory and, although eminent jurists had dealt with different aspects of the problem, little or no advance had been made. His own opinion was that the Crown in every murder case should appoint an independent tribunal to consider the medical side, having powers to investigate fully the mentality of the accused person. In that way the reliability of the medical opinion would be overwhelming, and would, no doubt, justly influence the opinion of the jury.

Dr. Hislop, speaking from twenty-five years' experience at Bethlem, said that he had come to the conclusion that knowledge of what was right and wrong was about as strong inside that institution as it was outside; therefore the test of responsibility depending upon a knowledge of right and wrong was fallacious. The law was loath to accept the fact that a person might lose all control without being legally insane, and the question of responsibility was always banned when a medical witness attempted an explanation. As an instance of the unreliability of juries he told the story of a man who was charged with a murder at Limehouse. It came out in evidence that the man had been seen creeping under the bed, and the jury, coming to the conclusion that no man in his senses could do a thing like that, promptly accepted the plea of insanity. "The man afterwards told me," said Dr. Hislop, "that he had dropped a tanner (sixpence) and was looking for it under the bed."

Sir Richard Muir, in the course of a survey of the law relating to insanity, said that the question of the practical application of the criminal law to persons suggested to be insane was one for which both the legal and the medical professions had endeavored to find solutions for a great many years. The legal profession was desirous of acquainting itself more thoroughly with the medical view, and would be ready at any time to accept a satisfactory definition of insanity; but, so long as they had trial by jury, they must have some working rule which would be understood by jurors. He was willing to learn from the medical profession how to apply rules so as to march with the advance of medical science, and the legal profession was willing to listen further to any possible amendment which could be suggested, but it must be an amendment which could be applied by a jury and understood by a jury. "That is the problem," concluded the speaker. "Find some definition of insanity which is satisfactory to you, which will be a protection to the public and which can be understood by a jury, and certainly the legal profession will not stand in the way of its adoption."

MILK.

Professor Eustace Hill, the president of the Society, said that in England the average daily consumption of milk per head was only one fourth of a pint according to a recent publication of the ministry of health, in contrast with the one pint in America.

Dr. W. J. Howarth, M. O. H., City of London, said he could not share Professor Robertson's confidence of the preeminence of America's milk supply. Dr. Howarth, who is not a believer in pasteurization as a safeguard of milk, said he hoped that so long as pasteurized milk is sold in Great Britain, it will be labeled as such, and receive no sort of commendatory recognition from the ministry of health.

Dr. W. Butler said that, as long as he had been a member of the Society, medical officers of health had been consistent in their demand for a pure milk supply, and he hoped that they would never be content with pasteurization as a substitute. A clean milk could be safely consumed in the raw state, and even the percentage of tuberculous milk had been enormously reduced.

Professor Robertson, in reply, said that his visit to America had overturned all his preconceived views as to the superiority of clean, raw milk; that it had been proved to him in America that pasteurization requires clean milk, if it is to be successful. The effect of pasteurization on the reduction of infant mortality had been remarkable in America, and he believed that even the inefficient pasteurization practised in England had been one of the great factors in saving infant lives during recent years.

HOSPITAL ALLIANCE.

The scheme just adopted between Middlesex and St. Luke's Hospital is stated to be the first instance in this country of an alliance between a large general hospital and a registered hospital for mental diseases. By cooperation in respect of funds, material, personnel and experience in management, the two hospitals are expected to attain the ideal in the treatment of early mental and functional nervous disorders while securing greater economy. Two new wards, for male and female inpatients, would be established in Middlesex Hospital, where patients will be treated by the medical staff of St. Luke's Hospital. A special outpatient clinic would be established for dealing with borderline cases, which would practically constitute a psychiatry section of the neurological department. So far as outpatients are concerned the scheme involves close cooperation of the two hospitals, and is a step towards a system which can and may be extended with advantage in other directions. As was stated in the report of the Court of Governors of the Middlesex Hospital, among the chief reasons which led to the adoption of the scheme was the marked disinclination among persons suffering from early mental disorders to consult the specialists at a hospital known to deal only with mental diseases. Such people were far more likely to attend at a general hospital for treatment on the appearance of their first symptoms. Early treatment on the right lines went a long way towards effecting a cure; delay was dangerous, or even fatal, to a successful issue. Treatment at a general hospital, also, did not attach the stigma which is popularly connected with a hospital dealing only with mental disease. In this way certification might be avoided.

INTESTINAL STASIS.

A discussion has been opened by Sir W. Arbuthnot Lane, who described his theory as to the cause of intestinal stasis, which in his opinion brought about directly or indirectly diseases of the colon. As is well known, the stasis, according to the views of Sir Arbuthnot Lane, is a result of the formation and development of kinks and bands in the colon. Sometimes operation was necessary but we wished to lay down with all possible emphasis that in such cases no operative procedure was justifiable until prolonged medical treatment had failed. Sir Henry W. Gray, of Aberdeen, could not agree with Lane about the formation of these bands being due to constipation and strain. Nor could there be any ground for the evolutionary theory, for these bands were never of any value for supporting the gut. Dr. A. J. Walton, of London, emphasized the marked increase in frequency of these conditions. He agreed with Sir Henry Gray that they were all of developmental origin and thought that eighty per cent. of those that showed symptoms were women. Symptoms did not appear until there was some ptosis. With regard to treatment he wished to draw attention to Lane's oft repeated teaching, that the treatment was essentially medical and operation was a last resource. He never fixed viscera unless symptoms pointed to one viscus, and even then he warned patients that they would not be absolutely cured.

BRITISH HOSPITALS.

It has been argued by some, and especially by those who have had any experience of American hospitals, that in order to relieve the financial strain upon British hospitals the system of pay wards should be introduced. In this country, however, change comes slowly and the doctor and layman alike in this country are wedded to the voluntary system by which such magnificent work has been done in the past. Yet it is recognized that steps must be taken to place the hospitals on a sound financial basis. Some of the hospitals are giving a tentative trial to the pay system. For example, somewhat longer than a year ago two of the wards of King's College Hospital which had been closed for lack of funds were opened for the use of private patients. A third ward was then required, and arrangements have been made to open a fourth in the course of a few weeks. Thus there seems to be no valid reasons why the system should not be introduced on a wide scale, although of course there are many difficulties to be overcome.

DEATHS FROM MEAT PASTE.

An inquiry opened at Drugwall, Scotland, on September 5th, into the eight deaths which occurred at Loch Maree as the result of eating meat paste. Professor I. K. Monro and Dr. W. E. Carnegie Dickson, who happened to be staying in the neighborhood, gave evidence at the inquiry. Monro expressed no doubt that the deaths were due to botulism and the other medical witnesses agreed with this opinion. Monro and Dickson both considered that little assistance would have resulted from the employment of antitoxin had it been available, and Dickson expressed the opinion that the damage to nervous tissue was already too far advanced. The pathological and bacteriological investigations are being conducted at Bristol. More than a year ago the Ministry of Health and the Medical Research Council combined to make arrangements for the fuller investigation of the conditions which cause sickness brought about by the various forms of bacterial food poisoning. It was further arranged that the investigation should be conducted in the laboratories of the University of Bristol. As the Scottish Board of Health came last year into the scheme the specimens from the Loch Maree cases were sent to Bristol.

EMPLOYMENT.

Statements recently made concerning the long hours and unsatisfactory conditions of employment of female assistants in eating houses in London, particularly in the southeastern district, have been specially investigated by the County Council Public Control, and they are satisfied that, apart from minor irregularities, there is no serious ground for complaint. In the smaller shops the provisions of the Shops Act, 1912, are generally adopted and the assistants are employed from sixty-eight to seventy-two hours a week.

MEDICAL MISSIONS.

A recent exhibition afforded proof if such proof were required, of the efficiency of the medical missions and of the good done by the workers therein. It should be stated that the men engaged in medical missionary work are men of the highest qualifications and it may be further said that practice in tropical countries is instructive and interesting in the first degree. Especially are there splendid opportunities for original research and the discovery of the causes of obscure diseases with the hope of finding out preventive, remedial and curative measures. Unfortunately at the present time, the medical staff of the missions is so inadequate that there is not time to attend to the sick and injured properly, and, of course, no time whatever for research. In fact, the deficiency of workers is a more serious impediment to work than a deficit of funds. However, if the work that has been accomplished in face of an almost paralyzing deficiency of staff and overwhelming financial deficit, a marvellous record is found. Forty-two thousand, eight hundred and sixty-three in patients have been admitted to the mission hospitals, 925,059 out patient visits have been attended to and more than thirty-six thousand operations have been performed. The missionary nowadays is a bodily as well as a spiritual healer and each of the mission hospitals constitutes a block house against epidemic disease and is for the good of the whole world. As a career while a position on a medical mission staff does not hold out the promise of gain or of greatness, it does offer a life of adventure spent in relieving sickness and in endeavoring to conquer disease.

Book Reviews

SURGERY OF THE EAR.

Handbuch der Speziellen Chirurgie des Ohres und der Oberen Luftwege. Mit Textabbildungen. Von Dr. L. Katz und Prof. Dr. F. Blumenthal. II Band, Lieferung 7. Leipzig: Verlag von Curt Kabitzch, 1922. Pp. 367-478.

This number (fasciculus 7, volume 2) of the Katz-Blumenfeld System deals exclusively with the operative opening of the mastoid antrum. The introduction gives a short historical survey of the origin and development of this surgical procedure. The chapter on diagnosis includes the bacteriology and pathological anatomy of acute, subacute and chronic otitis media purulenta. A comparatively long section is devoted to a thorough résumé of the indications for the mastoid operation and the interpretation of local findings as well as of constitutional symptoms. The details of the operation itself are then considered at length, including preparation, surgical technic, exposure of field, topography, hemostasis, and the special steps in the exposure of the sinus and dura. There are short but instructive sections on operations on the extremely aged and on hemophiliacs, relapsing mastoiditis, hypostatic abscess, aftertreatment, reinfection, keloid scar, change of dressings, plastic exposure of postauricular fistula, and so on.

THE HEART.

The Heart as a Power Chamber. Illustrated. By Harrington Sainsbury, M.D., F.R.C.P. Oxford Medical Publications. London: Henry Frowde and Hodder & Stoughton, 1922. Pp. xxi-248.

The title of the book commands interest and approval, emphasizing as it does the dynamics of the circulation. Medical studies, both physiological and clinical, have in recent years been devoted predominatingly to the cardiac irregularities and to their mechanism. It is time that the single track medical mind revert to the consideration of the dynamic and physical factors involved in the maintenance of the blood flow. The author is to be commended for emphasizing this important phase of circulatory disorders.

A perusal of the book, however, leaves the reader unsatisfied because so many important aspects of the subject have not been touched upon. Moreover, the author is often hampered in a clear presentation of his subject by the teleologic twist which he gives to all of his observations and speculations. Theories that attempt to explan phenomena as planned by Nature for a purposeful act are rarely fruitful. It is characteristic that in such a book experimental findings are made a subchapter, appended to a philosophical consideration of the facts under review. The elementary facts of the dynamics of the circulation are adequately presented. The author, however, disagrees with the present view that back pressure effects are relatively unimportant in producing myocardial insufficiency with its resultant symptoms and questions the current interpretation of venous tracings. His criticism is not always convincing, and he offers no adequate alternative explanation. One is astonished to find no mention of the fundamental work of Starling and his associates on the socalled "law of the heart." The employment of phrases such as "the katabolic heart," for the senile heart, is unfortunate and may be traced to the same liking for teleological reasoning. The real value of the book lies in drawing attention to the importance of the study of the dynamics of the circulation.

THE GALLBLADDER.

Studien über die Funktion der Gallenwege unter normalen und gewissen abnormen Verhältnissen. Acta Chirurgica Scandinavica, Supplementum ii. Von Dr. John Berg, Stockholm: Kungl. Boktryckeriet, P. A. Norstedt & Söner, 1922. Pp. 185.

In this, the third monograph on the subject, the author combined the clinical and pathological—anatomical studies of histories and specimens of gallbladder cases treated surgically, so as to obtain a clearer insight into the histologic basis, symptomatology and etiology of the socalled phenomenon of biliary stasis in the bile passages. The purpose of this work was to draw conclusions concerning the moot question of the normal functions of the biliary passages from the observations on the phenomena of stasis. The author believes that he has secured an additional aid for the differentiation of two different kinds of stasis in the biliary passages and also that the newly acquired material enables him to separate a group of sequelæ of uncomplicated, extrahepatic biliary tract forms and functional types, which he includes in the term rudimentary forms, from the true forms of stasis.

The subjects of mucostasis and cholestasis are discussed in their clinical, pathological, diagnostic and therapeutic aspects most thoroughly. This view of the subject also gives an impression of greater clarity in regard to the genesis of biliary calculus formation. As a result of the more thorough study of the pathology, as instituted by the author, the therapy is established on a more rational basis and the basis of prophylaxis is established more firmly. Besides aiding in a clearer understanding of the subject, with reference to the entire organism, it is a distinct improvement on the older methods of considering the subject. The detailed histories of sixteen cases, together with illustrations of the gross and microscopic lesions, are given.

ANIMAL PARASITES.

Animal Parasites and Human Disease. By Asa C. Chandler, M.S., Ph.D. Second Edition, revised. New York: John Wiley & Sons, Inc., 1922. London: Chapman & Hall, Limited.

Until one reads this most interesting and well-written book, one can hardly realize how many animal parasites may infest the human body. The author has considered these pests under the three great divisions, protozoa, worms, and arthropods, and he has made his work attractive enough to fascinate the reader like a best seller. He emphasizes the fact that the progress of sanitation and the betterment of health in general have been held back by unprogressive physicians and quacks who wilfully or ignorantly refuse to consider ways and means of destroying these innumerable parasites which so often destroy human life.

He cites in detail the history of the Panama Canal

Zone as convincing proof of the practical value of the knowledge which has come to us regarding the relationship between the mosquito and malaria. Almost despairingly he bemoans the fact that today, one hundred and twenty years after Jenner, there are numerous antivaccination societies whose sole purpose it is to denounce vaccination against smallpox, and he asks how we can expect popular belief in the mosquito transmission of malaria which was demonstrated only twenty years ago.

What is perhaps the most startling chapter in the book is his consideration of the subject of syphilis and its prophylaxis. Braving the wrath of the purists and the professional social hygiene workers, the author dares to express the view that "the most feasible plan, at present, as successfully tried in many European cities, especially Germany, is the municipal supervision of restricted 'red light' districts"; but he certainly is on solid ground when he declares that "the abolition of 'red light' districts is invariably followed by a parallel increase in clandestine prostitution, luring many who would abstain from unmasked brothels, to say nothing of the increase in seduction and rape of innocent girls." We venture to predict some disagreement from these views from highly influential sources.

Throughout the entire volume there is an atmosphere of sanity and clear thinking backed up by a thorough knowledge of the subject under discussion. The style is lucid and entertaining, and the reader passes from page to page and chapter to chapter fascinated by the marvels of Nature as exhibited by these minute enemies of mankind. The illustrations are plentiful and well drawn. Altogether the author is to be complimented on his excellent presentation of an otherwise dull and dry subject.

DISEASES OF WOMEN.

Diseases of Women. By HARRY STURGEON CROSSEN, M.D., F.A.C.S. Fifth Edition. Revised and Enlarged. With 934 Engravings, Including One Color Plate. St. Louis: C. V. Mosby Company, 1922. Pp. xxiii-1005.

This edition has been entirely reset and revised, bringing the entire subject up to date. Many of the newer developments in röntgenographic diagnosis are described in detail, such as abdominal and pelvic pneumoperitoneum after intrauterine insufflation of gas. The subject of x ray and radium therapy in uterine cancer, myoma, and other pelvic conditions are also discussed.

Pathological considerations are emphasized, particularly the subjects of more recent investigation, such as the changes in the endometrim, subinvolution of the uterus, adenomyomas and the part played by ovarian endometrial cysts. Actual photomicrographs are introduced to show the microscopic anatomy and pathology, thereby securing a complete survey of the tissue and condition involved. The pathological illustrations are excellent.

Gynecological diagnosis should be both anatomical and pathological, and that is the plan followed throughout this book. The headings and subheadings are arranged in such a way as to make this work an ideal reference book. The various symptoms encountered are also discussed in detail.

The chapter on therapy includes the various methods of treatment and their indications, with minute details regarding the carrying out of the treatment, each therapeutic remedy being treated separately, in addition to the treatment indicated in the various diseases and conditions, where the older plan of giving anatomy and pathology, symptoms, diagnosis and treatment is followed.

In the chapter dealing with the relaxation of the pelvic floor the newer methods of repair, aiming at the anatomic coaptation of the deeper parts, as well as the older methods are given. The more recent and improved methods of repairing the cervix uteri are fully described. Much space is devoted to the use of pessaries in displacements of the uterus; the operative measures, their advantages and disadvantages, are clearly indicated by a tabular arrangement. The use of x rays and radium and their indications and contraindications in myoma uteri are clearly given, the operative measures not being neglected. Separate chapters are devoted to malformations and disturbances of function, respectively.

The section on the endocrine glands was written by Hugo Ehrenfest. Special chapters are also devoted to the subject of the relationship of other organs to gynecology, the surgical invasion of the peritoneal cavity, including general surgical considerations and technic, the surgical aftertreatment and the medicolegal aspects of gynecology.

On the whole, this is an ideal book to place in the hands of medical students and practitioners: it is complete and up to the minute. The pathologic elements of disease are stressed more than in any previous book on the subject.

THE IMPULSE DRIVE.

Impuls-Handlungen. von DR. WILHELM STEKEL. Mit 4 textabbildungen. Berlin und Wien: Urban & Schwarzenberg, 1922. Pp. ix-520.

Stekel is always interesting, always voluminously instructive. He always offers a challenge to the individual reader to consider and to make trial of the psychoanalytical method for which he claims his large results. There is a challenge also to the acceptance or not of some of his own modifications of such method and of the theories with which he supports these. There is, too, a certain resonance of his own personal superiority accompanying the exposition of his material which makes one often distrustful of his claims to first discovery or alteration of some of the points of view of the older school of psychoanalysis. This casts uncertainty about the validity of some of his criticisms of their theories and activity. Aside, however, from such rather conspicuous and yet minor faults in his writings, his series of books constitutes a valuable contribution to the attested work of psychoanalysis. It brings understanding of certain special phases of the unconscious life and the forms in which psychopathology finds it manifested. He offers in all this and particularly in his pointed summarizing of his matter a challenge to society which it may not pass by. For while he attempts to understand his matter from the standpoint of the sick individual he no less lays its own share of the burden of the psychoneuroses, parapathies he chooses to call them, upon society's attitude toward the individual. He points out that the impulsive actions which society is prone to look upon only as criminal belong in the last analysis to the maladjustment represented by the parapathies and thus that crime or criminal actions are first of all curable as individual illnesses. The responsibility of society shall not cease until it has found them so. With a characteristically large optimism based on many unpleasant but adjustable facts he looks toward the day when such shall be common opinion and practice.

The title of the book informs us as to the specific content of this volume. Here as in the previous volumes Stekel has discussed the phases of his subject as he has found these in the lives of his patients, tracing them there in the unconscious in order to understand them from that standpoint out toward their external manifestations. Thus he finds the impulsive actions formed of the entangling infantile complexes with a significance and a possibility of readjustment undiscovered by the merely conscious observer.

Stekel's work is full of detailed material of actual clinical value. He makes free use of comparison with the points of view of other workers and thinkers upon these subjects. His style becomes rather over discursive as he supplements his own detailed case histories by likewise detailed reports from other writers. Yet his style is always so clear that one may gain knowledge and stimulus from any one portion of the book or from a more careful reading of the whole.

BODY NEEDS.

Einige neuere Betragtungsweisen in der Ernahrungstherapie. VON PROF. DR. ALFRED GIZON. Halle a.S: Verlag von Marhold, 1922.

Gizon considers the minimum amount of protein required by the body for twenty-four hours to be about one gram to one kilogram weight, or on an average sixty to seventy gm. of protein per day for an adult. Gizon thinks it best not to give patients much more protein than the minimum requirement. The reason for this is the great demand made in the working up of proteins on the work of the liver, kidneys, and the intestine. Gizon considers olive oil as a good fat nutriment and of much benefit in hyperchlorhydria and peptic ulcer; he gives one to two teaspoonfuls of olive oil three times daily before meals. Olive oil diminishes the gastric secretion, and, if taken in the fasting condition, accelerates gastric motility. The monograph is well written and contains much useful information.

BRAIN ABSCESS.

Brain Abscess. By WELLS P. EAGLETON, M.D.Lt.Col., M.R.C. New York: The Macmillan Company, 1922. Pp. xix-297.

The highly specialized domain of brain surgery will be enriched by the addition of this work. With great frankness the author has presented his failures and this material becomes of value when we consider that in every instance he has sought for their explanation and for a perfection in the technic of procedures both diagnostic and operative. The work has been carefully done. The author's own extensive experience in brain surgery, coupled with the study of a voluminous literature, adds to the value of the book. It is a workmanlike presentation of the labors of a man with sincerity and marked ability.

OPHTHALMOLOGY.

Ophthalmoscopy, Retinoscopy, and Refraction. By W. A. FISHER, M.D., F.A.C.S. With 248 Illustrations Including 48 Colored Plates. Published by W. A. Fisher, M.D., F.A.C.S. Chicago, Ill.

Fisher's manual, combining as it does a description of two of the most important methods of clinical examination of the fundus oculi with the estimation of ametropia, contains a great deal of information presented in a practical and easily assimilated way. It is not the author's fault that it is a physical impossibility to dispose of these far-reaching and by no means simple subjects in the space which he has devoted to them. Of ophthalmoscopy in particular, one may well say that Fisher's book will give merely a smattering to those who are beginners and will not be of much value to the expert. The illustrations are numerous and yet inadequate as they are rather schematic and on much too small a scale, while the descriptive text in many instances fails to explain, fully, the details of the fundus picture it accompanies.

PLAYS BY EUGENE O'NEILL.

The Emperor Jones; Diff'rent; The Straw. By EUGENE G. O'NEILL. New York: Boni and Liveright, 1921. Pp. x-285.

The Hairy Ape, Anna Christie, The First Man. By EUGENE O'NEILL. New York: Boni and Liveright, 1922. Pp. 322.

The first volume contains that momentous study of primitive psychology, that has held Metropolitan audiences entranced for over a season. Fear, the supreme god of the savage, is harrowingly pictured. The perspective given to the lines of The Emperor Jones by the stage setting, the acting, the personality of players and writers, makes this play a masterpiece of technic. The emotions of a neurotic, love starved woman, presented in *Diff'rent,* again cling to the memory like some brutal scene of which one has been the unwilling spectator. *The Straw* pictures in more normal fashion the way playgoers believe the mind works. The little heroine dying of tuberculosis and for want of the will to live, is saved by her lover at the tense last gasp.

Vignettes of the psychology of emotions are these, stark and unadorned. In the second volume theory, philosophy, a more subtle psychology creep in to make the plays the intricate spider web where our own emotions hang helpless. *The Hairy Ape,* striving to understand, lost, tongue tied mentally though not physically, begins the tirade against things as they are. *Anna Christie,* the strongest of O'Neill's plays since *Beyond the Horizon,* introduces two characters to contemporary drama that will live down the ages. Father and daughter in the eternal struggle of evasion and life finally drift to their inevitable end. *The First Man,* a social travesty on the emotions of parenthood, gloomily winds its Victorian coils in Bridgeport, Conn. This is the only one of the plays that is not good. There is lack of plausibility; the whispering mob of relatives that clings about the intrepid explorer seems overdrawn. It is all too ponderous.

To have these plays in book form is of inestimable value. All, even the last, merit careful study, appreciation. Mr. O'Neill's work opens up a hopeful future for drama in America.

PERSONALITY.

Up Stream. By Ludwig Lewisohn. New York: Boni & Liveright, 1922. Pp. 248.

The evolution of a personality has a magic of its own. That is the secret of the fascination of autobiography of every sort. But in Mr. Lewisohn's biography there enter factors distinctly unusual. The initial racial hindrance to his progress has been keenly studied, even his overcompensations recognized. The part played by his mother in his life reveals once more the power of unconscious patterning, the moulding of a man's destiny by the chance occurrences of the first few years of his life. *Up Stream* has achieved the goal of a novel. It transcribes life, with that blending of reality and fancy that colors all true romance. A sound book; a delightful piece of literature, and as entertaining as it is valuable.

THE BEE.

The Adventures of Maya the Bee. By Waldemar Bonsels. Illustrated by Homer Boss. New York: Thomas Seltzer. 1922. Pp. 224.

This airy phantasy is delicate, picturesque. It is a delightful bit of soap bubble creation. There is a little fact in it, details not too wearisome of the insect world. It is the eminently correct Christmas gift for the young child with sufficient insight into the facts of Nature not to have an attack of horrors from the discovery that insects eat each other.

Medicoliterary Notes.

A recent bulletin of the Department of Labor and Industry of Pennsylvania reports that, through the investigations of the Bureau of Hygiene and Engineering, the discovery has been made of a regularly established underground traffic in the use of second hand stuffing materials for upholstery, represented to buyers as brand new. Some of this material has been found to be filthy beyond description, and a haven for germs, insects and many kinds of refuse. Even floor sweepings are used to piece out short quantities.

* * *

Constantinople Today is the title of a book recently published by eight welfare organizations working in Turkey. It is the result of a survey of social and economic conditions in that country.

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Joachim Sorolla, son of the famous Spanish painter, has arrived in this country with an exhibit of his father's pictures to be shown at the Hispanic Society, Broadway and 155th Street.

* * *

Steps are being taken by the Bowling Green Neighborhood Association, a welfare organization for poor relief in New York City, to wipe out the scourge of tuberculosis in a small area of the city near Wall Street, inhabitated almost entirely by the scrubwomen, porters, janitors, window cleaners and other workers who labor in the great downtown office buildings. It is reported that the death rate in this section from tuberculosis is three and a half times as large, and infant mortality double the average rate in other districts of New York. The association plans to make a survey of the neighborhood, with physical examinations and clinics, nutrition classes for adults and children are to be organized, literature in all languages to be distributed, and health plays and films shown. A permanent educational exhibit will be set up in the Community House at 45 West Street as a part of the antituberculosis campaign, and complete statistical records kept.

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Abnormal Behavior, by Dr. Phyllis Blanchard and Dr. Irving J. Sands, has been announced for publication by Moffat, Yard & Co.

* * *

The physician who is interested in social, economic, the psychological problems will find a great deal of food for thought in *The World We Live In,* familiarly known as the "insect play." It is perhaps the most original in conception, and certainly one of the most revealing of the dramas now on the boards.

* * *

The American Committee for Devastated France has announced that it will build and administer for a limited period the first modern training school for nurses in France in connection with a hospital being enlarged by Dr. Oberthur of Paris. A year's investigation has recently been made by a group of Americans interested in nursing and public health, as a result of which Professor Calmette, of the Pasteur Institute of Paris, at the head of a group of representative French physicians, formally requested the committee to establish a model nurses' training school. Under the leadership of Dr. C. E. A. Winslow, of Yale University, a committee was formed to do the work, and three young French women have been in training in the United States for several months to become qualified to carry on later the work in their own country.

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In an entertaining article in the *Atlantic* for December, Elizabeth Stanley Trotter writes on Humor with a Gender, a discussion of the differences in the sense of humor between men and women.

* * *

The works of Arthur Machen, the Fleet Street English journalist whose stories have only recently reached this country, will soon be published complete in a nine volume edition. Some of the best known of these are *The Great God Pan, The Hall of Dreams, The House of Souls, The Terror,* and *Hieroglyphics.* To the psychoanalyst interested in the psychology of fear and of the sense of sin and in symbolism these tales should be significant. Another book in which he will find entertainment is the second volume of Harvey J. O'Higgins's short stories based on studies of various American types.

New Publications Received.

GONORRHEA AND IMPOTENCY. Modern treatment. By Edwin W. Hirsch, B.S., M.D. Chicago: The Solar Press, 1922. Pp. 12-172.

THE DIAGNOSTICS AND TREATMENT OF TROPICAL DISEASES. Illustrated. By E. R. Stitt. Fourth Edition—Revised. Philadelphia: P. Blakiston's Son & Co., 1922. Pp. xiii-622.

Practical Therapeutics

THE THERAPEUTICS OF SURGICAL PAIN.

By John Hubley Schall, M. D., F. A. C. S.,
Brooklyn, N. Y.
Surgeon, Prospect Heights, Jamaica and Community Hospitals.

The efficiency of any specialization in medicine is seriously hampered if the maxim, "be a physician first and then a specialist," is not rigidly observed. Physiological relationships should not be neglected, or considered secondary to anatomical ones. The study of physiological pathology is receiving more consideration, and its study is as indispensable in surgery as elsewhere.

The inaccessibility for inspection of many organs, except in limited and welldefined instances by the x rays, has accorded the important symptom of so-called pain a valuable diagnostic significance in surgery.

There are four important classes of cases associated with pain that require relief by the surgeon. 1. Pain appearing as a symptom for surgical diagnosis and operative intervention. 2. Pain having existed for some time where operation is indicated, but necessarily must be delayed for diagnostic purposes or operative risk. 3. Postoperative pain. 4. Pain in inoperable cases and the moribund from surgical affections.

The management and treatment of the first class of cases calls for surgical judgment to a degree not required in the other divisions. It places upon the surgeon the responsibility of furnishing relief without at times masking the only signpost leading to a correct diagnosis. It cries both for and against narcosis. It has demanded the lesser of the two evils, that of furnishing relief with morphine or one of its derivatives, or allowing the patient to suffer some pain for the purpose of ultimately saving his life. It is better to allow acute abdominal pain with a diagnosis of appendicitis, operation and recovery, than bring about a narcosis, a ruptured appendix, pus in the abdominal cavity, peritonitis, and death. Therefore while the diagnosis is pending, we have needed a drug which would cause a state between analgesia and narcosis.

The time required for a full history, complete examination, and the results of various tests, frequently demands more or less suffering on the part of the patient. Any of the following conditions, among others, may be responsible for the abdominal pain, which may be taken as a surgical prototype for our consideration: Acute indigestion, cholecystitis, ovarian or tubal disease, pneumonia with referred pain, intestinal colic, acute interitis, typhoid fever, gastric ulcer, dysentery, pancreatitis, hepatic colic, intestinal obstruction, renal colic, movable kidney, ureteritis, epididymitis, dysmenorrhea, lead poisoning, hipjoint disease, incipient inguinal hernia, malignant tumor, pleurisy, Pott's disease, cerebrospinal meningitis, abdominal crisis of locomotor ataxia, distention of the urinary bladder, hysteria and appendicular hypochondriasis. A mass in the right iliac region may be the result of fecal impaction, neoplasm of the structures in this region, especially the appendix and cecum, cysts, lymphadenitis, foreign body in the intestine, intussusception, cholecystitis with distention, aneurysm, abscess (from the vertebræ or pelvic bones, iliopsoas or abdominal muscles), pericecal abscess, pelvic cellulitis, inflamed undescended testicle, properitoneal hernia, displaced kidney, phantom tumor, and various other local or remote causes.

The second class of cases associated with pain comprise those where a diagnosis has been made and operations decided upon, but whose physical condition must first be improved, or those in whom pain has persisted for some time, and who are being kept under observation for diagnostic purposes. In this class of cases, not of the acute class, it is necessary to prevent the pain from interfering with the proper preparation of the patient for operation, and from lessening his resistance, thus decreasing the operative risk and assisting the postoperative convalescence.

The third class of cases, postoperative pain, interferes with the recuperative powers, delays convalescence, and adds a neurotic element or increases one already present. This is particularly the case in gynecological cases, where long continued invalidism has drained the resources before operations. This does not refer of course to unavoidable pain of more or less brief duration sometimes as a necessary sequel to abdominal operations, such as gas pains, but rather to pain from wounds, or surgical traumatism in hypersensitive cases.

The fourth class of cases are the inoperable ones, especially malignancy where operative interference is either contraindicated or futile, and where relief must be given. Notwithstanding the gravity and hopelessness in such cases it is certainly better at times to have means at our disposal whereby we can relieve the suffering of such a patient without the abolition of consciousness, especially in instances where impending dissolution may extend over a prolonged period of time.

Until recently the only means at the disposal of the surgeon where severe pain was a predominating factor consisted of morphine and its derivatives, either by mouth or more generally by hypodermic administration.

One of the most recent classifications of pain in surgical conditions and apparently a good one is that by Karewski (1), who comes to the conclusion that not only the cerebrospinal nerves but also the sympathetic nerves may cause pain in these organs. He differentiates four types of abdominal pain: 1. Colic caused by contraction of the walls of hollow organs which is purely organic pain and characterized by alternate remissions and exacerbations; 2. pain caused by distention of the intestines, which is continuous, not intense and is a sign of increased stenosis of the large intestine, which as a result of peristaltic adaptation does not cause colic; 3, general abdominal pain which indicates involvement of the parietal peritoneum and is characterized by the appearance of reflex tension of the abdominal wall; it is often distinctly localized but may be diffuse, especially in perforation of a hollow organ into the abdominal cavity; 4, perforation pain which is particularly severe, diffuse and continuous.

In order to fully realize the significance of pain referable to a given area, there are several additional factors to be taken into consideration. They are an understanding of the nerve distribution in the painful area, the significance of the character of the pain, its manner of onset, and any associated conditions such as vomiting, pulse and temperature changes, leucocytosis, and other indications. Furthermore, the psychological element should not be overlooked, especially in neurotic patients, as it is particularly in such cases that the morphine habit is later established.

The difficulty which had hitherto presented itself to surgeons was the absence of any intermediary therapy for the relief of pain, between a mild analgesia and narcosis. In severe pain the only choice appeared to be between a practical placebo or unconsciousness. Physiological doses had not yet been established for the relief of surgical pain. In other words, in order to lessen the noise of the telephone the central station had to be put out of commission. Severe pain could only be abolished by preventing its complete appreciation. There are degrees of central analgesia without the abolition of consciousness, and without the complete extinction of sensation, motion or reflex activity, as there are gradations of unconsciousness which are measured by the stimulus required to arouse the patient. The term so often expressed "partial unconsciousness" is of course a question of degree and not of kind.

The administration of an analgesic drug to any degree affecting consciousness is manifestly dangerous, while on the other hand narcotics are frequently not effective for analgesic purpose alone unless pushed to the point of a partial abolition of consciousness.

Our therapeutic nomenclature has been enriched, and our resources for the relief of pain due to surgical conditions pauperized by the interchangeable employment of hypnotics, narcotics, depressants, soporifics, somnifacients, and what not, eventually subscribing to the almost universally adopted routine of hypodermatic administration of morphine as a short cut to the desired goal. As a result diagnosis has been obscured, elimination retarded, and thousands of morphine habitues irrevocably consigned to lives of addiction and degradation.

There is a vast difference between the indications for narcosis in surgical operations and that for the relief of pain before or after operation. As yet we have had no satisfactory analgesic drug that could be given in safe doses where intractable pain and insomnia were present; nor could its physical admixture with opium or any of its derivatives produce a controllable product. To satisfactorily relieve the pain of an acute abdominal condition without narcosis has been one of the therapeutic problems of the surgeon. notwithstanding the studies upon the conductivity of pain.

We are indebted to Burns (2) for being the first to have called our attention to a new nonnarcotic drug which is both hypnotic and analgesic, and which promises through the successful researches in the domain of synthetic chemistry, to furnish us with a therapeutic lever to control analgesia and hypnosis, without involving the dangerous field of narcosis. This would not have been attempted without thoroughly recognizing the fact that the cause of an insomnia may be due to any of a series of courses from a mild nervousness to a severe pain, and that the production of sleep in one case cannot be approached in the same manner as that in another. For this reason it has been taught for years never to use morphine unless the insomnia was due to pain, nor has the large list of analgesics and hypnotics found favor for the relief of insomnia due to pain. This has been due to the fact that the predominating symptom-pain, unless controlled first, prevented the therapeutic efficiency of the hypnotics.

The new drug, allonal, described by Burns, appears to be the culmination of the accumulated investigations in the field of the barbituric acid series, drugs, which although valuable hypnotics, apparently have lacked the additional and indispensable requirement, at the same time to control the pain. As the result of a great amount of animal experimentation, supported by abundant clinical observation, a new barbituric acid derivation was selected as the starting point for the additional chemical incorporation of an analgesic molecule. The allyl-isopropyl-barbituric acid was therefore chemically combined with amidopyrin by fusion, producing a double salt, which exemplified not only potential analgesia but a fortification of the preexisting hypnotic properties. The biological and chemical inspiration that led up to these results, and the scientific basis from which the production of a drug developing simultaneously hypnotic and analgesic properties was evolved are fully described in Burns's article.

The brilliant results already obtained, as described by Burns, of Philadelphia, Dr. Frank Wright, of Chicago, Or. L. Stieglitz, of New York City, and Dr. A. C. Messmer, of Ardmore, Pa., constitute the pioneer investigations of allonal based upon a number of welldefined and acid tests for the relief of pain, which in some instances could not even be controlled by morphine. When I learned from such sources that these results were obtained in conditions such as carcinoma of the rectum, mucous colitis with exaggerated peristalsis, chronic cholecystitis associated with arteriosclerosis, incurable intercostal neuralgia, probably due to a neoplasm pressing on the nerve, tic douloureux, lightning pains of tabes dorsalis, pain in rheumatoid arthritis, melancholia with drug addiction, multiple neuritis, and cerebrospinal lues, I welcomed an opportunity for a clinical investigation.

The following will serve to illustrate types of surgical cases which came under my observation during the past year and where allonal was administered with gratifying results:

Case I.—Mrs. H., aged thirty, operated on for external and internal hemorrhoids. The pains were severe, spasmodic and paroxysmal in region of the sphincter muscles. Allonal promptly reduced pain and induced sleep in this patient. The pain of this class of cases usually is relieved only by hypodermic or morphine or opium suppositories.

Case II.—Mr. C., aged twenty-one, fractured rib with contusions and lacerations of intercostal muscle. After the usual surgical treatment, the patient was restless and unable to sleep. He had severe pain on the slightest movement of the body, also during respiration. Allonal relieved the pain and induced restful sleep.

CASE III.—Mrs. G., aged forty, carcinoma of the breast with involvement of axillary glands. A radical operation was performed. This patient had suffered considerable pain prior to the operation which was relieved by morphine. Two days after the operation morphine was discontinued and allonal given, which allayed the pain and induced sleep. In many of the more advanced cases of carcinoma I have found allonal a remedy *par excellence* for the relief of pain and general comfort of the patient.

CASE IV.—Mrs. G., aged thirty-eight. This patient had had a removal of her appendix and a central suspension of the uterus. Following the operation there was a retarded peristalsis, slight tympanitis, cramps in the abdomen and pains in the region of the uterine anchorage. The patient was restless and could not sleep. These postoperative symptoms usually call for morphine. Within half hour after receiving a dose of allonal the patient was relieved and a little later was sleeping quietly.

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VACCINE THERAPY, THEORY AND PRACTICE.

By L. F. ROBINSON, M. D.,
Greenville, S. C.

Infections contracted during natural processes always start with small beginnings. A boil may start from a small focus of infection in a hair follicle. A coryza, mastoid or sinus infection starts from a small germ invasion. Pneumonia develops from a comparatively small number of pneumococci gaining entrance to the circulating blood. Wound infections are usually developed from a small number of germs that happen to get into the wound. A puerperal sepsis starts with small proportions. In contagious diseases it is not probable that there are many germs conveyed from the sick to the healthy to cause infection. Infections practically always start with a small dose of infecting organism. It is due to the susceptibility of the infected individual to the invading organism that makes an infection possible. The infection does not become established because there is an overdose of the invading organism but because the small number of organisms which establish themselves grow and multiply at the expense of the invaded tissues. If germs were adequate in antigenic influence in the early stages of an infection, tissue resistance from antibody production would develop long before destructive processes from the infection would have time to develop. In the early stages of an infection germ multiplication progresses rapidly. This shows that the infecting organism bears a relation of virulence towards the involved tissues. Virulence of an organism depends on rate of multiplication, and rate of multiplication depends on the effectiveness of the ferments which the germ secretes, with which it digests and prepares the food on which it lives. It is this digestive capacity of the infecting organism which exerts such a destructive influence on the living tissues. In fact, this destructive capacity of the living germ is so pronounced that instead of influencing cells for antibody production they are crippled in their defensive capacity, and from the course these infective processes pursue it is entirely probable that infecting organisms only become true antigens after their virulence has become modified during the course of the infection. Naturally, the earlier in the course of an infection tissues can be influenced in their defensive capacity by germs of the same kind that are responsible for the infection that have been modified in their virulence (true antigens) the sooner will immunity become established.

This is exactly what is accomplished by giving a vaccine in the early stages of an infection. In the early stages of acute infections the invading organism is too virulent to exert a proper antigenic influence. By injecting killed germs into healthy tissues, cell activities are at once roused to dispose of or eliminate them. The germs being killed, possess no destructive influence nor can they increase their toxicity by growth or multiplication. Their toxicity is modified and consequently they possess true antigenic properties in relation to the tissue cells with which they come in contact. Possessing identical biochemical constituents to the organisms responsible for the infection, the antibody produced as a result of the killed organism injection is the same as the antibodies that may be developed from the antigenic influence of the live organism in the infected area, and consequently has the same destructive influence on the invading live organisms with the advantage of obtaining rapid antibody formation in the early stage of the infection and by this means eliminating the infection before destructive processes have time to develop. In other words, by injecting killed organisms or bacterial vaccines we obtain real antigenic influences to bear on the infective process before the infecting organism becomes sufficiently modified as a result of its environment to become an adequate antigen.

In case this modification of an infecting organism towards becoming a true antigen develops slowly, or is arrested, the infection will become chronic. Some infecting organisms are distinctly inclined to producing chronic infections. As a rule, these organisms do not show special virulence in the early stages of the infection, but the infection has a tendency to drag on. This is particularly true of the gonococcus, staphylococcus and certain types of the streptococcus. In these infections the antigenic properties of the live organisms are limited and often almost nil, whereas the killed organism of the same variety when injected into healthy tissues, shows marked antigenic properties as demonstrated by the clinical results obtained.

In the application of bacterial vaccines for therapeutic immunization the proper dose is of utmost importance. Infections present, broadly, three conditions: Extensive acute infections, minor acute infections, and chronic infections, and in each of these conditions the dose and interval between inoculations varies greatly.

In extensive acute infections, associated with much rise in temperature and other toxic disturbances as in pneumonia, bronchopneumonia, erysipelas, scarlet fever, puerperal sepsis, pelvic cellulitis, extensive wound infections, and other conditions, large doses of vaccines are tolerated without causing any appreciable reactions, either in rise of temperature or infiltration at the site of inoculation. Inoculations are made at short intervals to great advantage. The adult initial dose is four or five times that usually employed in chronic infections or one mil. (c. c.) of an average stock vaccine, inoculations being made at daily intervals. As a rule, if the vaccine is given early in the course of the infection, marked clinical improvement will be observed within twenty-four hours, but inoculations should be made at daily intervals for at least three injections. If the temperature has meantime become normal, injections are extended to two day intervals and as recovery advances they are made three or four days apart, but should not be discontinued until all signs of the infection have disappeared. Patients with severe infection should receive one mil. doses twice daily for one or two days and at longer intervals after the temperature, pulse and other clinical symptoms show definite improvement. If, after the temperature has returned to normal it rises again one or two degrees, this would indicate a falling back of immunization and would call for another injection, especially so if no vaccine has been given for several days.

Minor acute infections, like colds, acute otitis media, slight wound infections, boils, and similar conditions, require a small initial dose, about 0.2 mil. or three minims of the usual stock suspension, and the dose should then be increased in accordance with the reaction that developed from the first injection, inoculations also being made at short intervals, from one to three days apart. If one mil. doses are given in these cases unpleasant local and constitutional reactions are liable to follow and the clinical results are not so good as when the dose is so gauged that marked reactions are avoided. As a rule, the dose may be increased to one mil. within four or five treatments, but if considerable infiltration develops at the site of inoculation it is not wise to materially increase the subsequent dose even if a number of small doses are given in succession. As a rule, it is not necessary to work the dose beyond one mil.

In chronic infections we have two kinds of reactions from the use of vaccines focal at the site of infection, and local at the site of inoculation. For this reason treatment should be started by giving a small dose and the dose should not be repeated until all signs of reaction from the previous dose have subsided, which is usually a week. More failures from the use of vaccines in the treatment of chronic infections are due to overdosing and giving them at too short intervals than from all other causes combined. I am frequently consulted for advice in the treatment of cases that do not progress favorably, and almost invariably it is found that too large doses were employed, the vaccines were given at too short intervals, or both. The best immunizing responses are obtained if only a slight reaction develops at the site of injection, the infiltrated area not being larger than a silver dollar. If an inflammatory area develops three or four inches in diameter, the tissues at the site of injection appear to be severely taxed and consequently not so capable of antibody production, a condition similar to that which prevails in an infection, but by gauging the doses to produce a moderate reaction the maximum immunizing response is obtained. As long as this fundamental condition for producing immunizing responses, from the hypodermic use of bacterial vaccines, is not recognized in the treatment of chronic infections by the practicing immunologist, the best results from the use of vaccines will not be obtained.

The greatest advances in the prevention and cure of disease have been brought about through immunization. The use of bacterial vaccines in the more common infections, is both prophylactic and therapeutic; prophylactic in that the infection is brought under control, and in this way prevents more serious diseases, and therapeutic in that the existing infection is more rapidly eliminated.

714 West Washington Avenue.

Two and a Half Years' Antenatal Work.—Mary E. Weston (*British Medical Journal*, May 27, 1922) shows the great value of the antenatal clinic as an educational factor and its possibilities in preventive medicine among the socalled normal cases of pregnancy. Forty per cent. of women out patients suffer from some form of ill health directly or indirectly due to pregnancy, which are the result of neglect of the socalled minor maladies. Their prevention is a matter of individual teaching, to be carried out in antenatal clinics. In 138 cases, 42.8 per cent. of the patients suffered from constipation, 36.5 per cent. from flatulence and heartburn, 31.7 per cent. from severe varicose veins, and 52.38 per cent. from vomiting. All of the women received detailed teaching on hygiene—principally on clothing, diet and exercise; no medicines were given, except socalled domestic remedies, so as to maintain the purely educational character of the clinic and not to interfere with the general practitioner. Had the simple measures failed, the patient would have been referred to a physician, but this was not found necessary in a series of two hundred cases.

There is also a great need for research in antenatal physiology and pathology, in statistics on the conceptional rate, on intrauterine mortality, stillbirth rate, and also on intranatal and neonatal mortality; also analytical and experimental statistics on the effects of different toxins, x rays, etc., on the germ cell, or on the fetus during all the stages of its development. Such clinics especially endowed for such purposes are very costly and not all pregnant women would avail themselves of such an opportunity for various reasons, but an educational centre, planned along these lines, can be maintained almost as easily as an infant welfare station. It would also aid in collecting statistics on the effect on labor and lactation of different occupations and of the number and frequency of pregnancies, and of the relation between various menstrual disorders and fertility; it would also serve as a collecting centre, from which special cases could be referred to the larger and more fully equipped clinics.

Should the Kielland Forceps Be Used by the General Practitioner?—Klaus Hoffmann (*Zentralblatt für Gynäkologie,* May 20, 1922) states that the Kielland forceps gave very satisfactory results in a series of ninety-four cases. Young physicians, who never or only occasionally applied an obstetrical forceps, had no difficulty in using it and were enabled to spare the soft parts, which is a rare occurrence with the use of the ordinary obstetrical forceps. Cases that formerly offered considerable difficulties were delivered with ease by means of the Kielland forceps. The author recommends it as the only one to be used by the general practitioner and that the Naegele and axis traction forceps should be abandoned. It is needless to say that the physician must know the indications for its use as well as its manner of action. These should be taught to all medical students in the medical schools. Its great advantage is the fact that it can be applied to the biparietal diameter of the fetal head and that it is a protection to the maternal soft parts. Its advantages far outweigh its disadvantages.

Treatment Fracture of Femur.—C. E. Early (*American Journal of Surgery,* September, 1921) concludes that: fracture of the femur is a serious process, both in its immediate aspect and in its possibility of permanent impairment of function. The Whitman and Thomas splint methods bring almost perfect results if properly applied. The medical profession was slow to take them up but the great war and later experiences in industrial surgery proved their efficacy. Every case should be painstakingly watched. Daily inspection and frequent x ray examinations are as essential as the proper application of the method chosen for treatment. The mobility of the knee should be carefully guarded by free, passive, and active movements and by massage.

Control of Bleeding by Sodium Citrate.—Neuhof and Hirshfeld (*Annals of Surgery,* July, 1922) give the following summary in the use of sodium citrate: 1. The administration of sodium citrate intramuscularly, intravenously, or subcutaneously, results in prompt and pronounced shortening of coagulation and bleeding time. This is a hitherto unrecognized pharmacological action of the drug. 2. The shortened coagulation time is of two to three hours' duration with gradual return to the normal within twenty-four to forty-eight hours. 3. The sodium citrate curve occurs not only in individuals with normal coagulation and bleeding time, but also in those in whom there is pathological prolongation, notably in jaundice. 4. It does not occur in blood diseases characterized by blood platelet deficiency—hemophilia and purpura. These diseases appear to comprise the sole contraindication to the use of sodium citrate for the control of bleeding. 5. The dose for intramuscular administration of sodium citrate is nine grams for adults. A thirty per cent. solution is used, fifteen c. c. into each buttock, preceded by novocaine. The intramuscular method is free from danger, no untoward results having been noted in two hundred cases, and is therefore the method of choice. Internal as well as surgical bleeding, hemorrhage not only in normal individuals, but also in those with prolonged coagulation time are decisively controlled by sodium citrate injections in the great majority of cases. These are cases of oozing surfaces or hemorrhage from small vessels, for control of hemorrhage from large vessels cannot be expected with the dose of the drug at present employed. 7. The method offers as well a large sphere of usefulness as a prophylactic measure against oozing at operation, especially in cases in which much bleeding is anticipated.

Surgical Treatment of Chronic Ulcerous Colitis.—A. Krogius (*Finska Läkaresällskapets Handlingar,* July-August, 1922) reports a case of a forty-six year old female who had suffered eight years previously from pains in the abdomen and frequent bloody stools. She remained well for some time after treatment in a hospital. When the attacks recurred she was treated with enemas and typhlostomy. Again she remained well for a time. The last time that these attacks recurred, she could get no relief and showed no improvement from hospital treatment. The patient lost rapidly in weight and strength, and suffered from violent colicky pains, with increased peristalsis in the proximal half of the large intestine. The stools were frequent and showed blood and mucus. The mucous membrane of the rectum was of normal appearance. Implantation of the lower ileum in the pelvic colon was performed. The intestinal wall of the distal end of the transverse colon, descending colon and sigmoid showed marked inflammatory infiltration. The walls of the ascending colon and the greater part of the transverse colon were hypertrophic, but showed no signs of inflammatory changes. The pains disappeared after operation, the patient gained in weight, and the stools though still watery contained no more blood or mucus. Röntgen examination revealed no congestion of fecal contents in the colon. The author states that in his opinion colostomy is too often the operation of choice in chronic ulcerous colitis, when in many cases internal anastomosis would be the safest procedure.

Colloidal Benzoin Reaction of Cerebrospinal Fluid.—Fanny Warnock (*Journal of Laboratory and Clinical Medicine,* April, 1922) carried out the colloidal benzoin reaction as given by Guillain, Laroche and Lechelle, on all the spinal fluids received in the laboratories of the Michael Reese Hospital during five months. This study comprised eighty-seven cerebrospinal fluids, twenty-nine of which were diagnosed syphilitic, either clinically or from the laboratory standpoint, and fifty-eight of which were nonsyphilitic. Of the twenty-nine syphilitic fluids twelve precipitated in the syphilitic zone. Each of them continued beyond that range; of the fifty-eight nonsyphilitic fluids fifteen precipitated in the syphilitic zone. The following conclusions are drawn: Undoubtedly syphilitic cerebrospinal fluids do not regularly precipitate in any definite zone of dilutions. The benzoin reaction adds little in doubtful syphilitic cases. Tuberculous meningitic cerebrospinal fluids do not precipitate the colloidal benzoin in any definite range of dilutions. Many nonsyphilitic cerebrospinal fluids do precipitate the colloidal benzoin suspension, and even precipitate it in the socalled syphilitic zone.

Abstracts from Current Literature

Diaphragmatic Hernia.—Andreas Plenk (*Wiener klinische Wochenschrift,* April 13, 1922) reports a case in which a man, forty-four years old, always had a socalled delicate stomach and symptoms of gastric ulcer for twelve years. The pain radiated to the right shoulder and back from the epigastrium, and all his symptoms were aggravated by lying on his right side and by movement. A röntgenogram revealed a right sided eventration of the stomach with displacement of the stomach to the right. After a severe vomiting of blood and the beginning signs of perforative peritonitis he was operated on. The laparotomy revealed gastric contents in the peritoneal cavity and a fresh diffuse peritonitis; the stomach was displaced and dragged the duodenum steeply upward toward the esophageal foramen; gastric contents escaped from the left edge of the duodenum. The stomach could not be replaced because of numerous adhesions, which fixed both the pyloric region and the lesser peritoneum in abnormal positions. Because of his poor general condition only drainage toward the pleura and irrigation of the peritoneal cavity could be done. The necropsy showed the hernial site to be at the esophageal hiatus, slightly mesial and behind the tendinous centre of the diaphragm, just in front of the vertebral column. The stomach was almost entirely enclosed in a peritoneal hernial sac and was half turned to the right and posteriorly; the cardia was about seven cm. above the esophageal hiatus and the esophagus was just that much shortened. The peculiar features of this case are the absence of symptoms up to the thirty-second year of the patient's life, when the symptoms were chiefly due to an ulcer. The sites of pain in the epigastrium and right shoulder and the röntgenogram were significant clinically.

Cheyne-Stokes Respiration.—Hess and Rosenbaum (*Wiener klinische Wochenschrift,* June 15, 1922) state that respiration, circulation and muscular activity are primitive functions; the same applies to certain forms of muscular tremor. Cortical insufficiency may produce tremors just as do pathologic respiratory and blood pressure pictures. Periodic breathing and tremor may result from cold. The coincidence of variations in blood pressure and tremor has been noted in the literature.

The authors proceed from the assumption that the primitive functions of breathing, propulsion of blood and muscular activity rest upon a complicated collaboration of unequal and unequally affected centers. This theory is substantiated by a combination of all the remarkable pictures of Cheyne-Stokes respiration, tremor forms, and the Sigmund Mayer and Traube-Hering waves; only when the most peripheral and central neurons with their interposed connections are intact does normal work result. The most sensitive neurons are in the cortex. Owing to most varying conditions, these are irritated and pathologic respiratory, blood pressure and muscular movements result as a projection of the cortical decrease in function. In this way it is also possible to consider as a unit the associated phenomena of Cheyne-Stokes respiration (pupillary phenomena, motions of the eye, fibrillary twitchings, etc.). As soon as the pathological respiratory, blood pressure and tremor forms are more thoroughly correlated, they can be used as an indicator for the function of the cortex and may lead to extensive conclusions, similar to those drawn from the Babinski phenomenon. The cortex has a greater influence on the normal occurrence of respiratory and muscular movements and variations of blood pressure. In various ways which aim to detract attention during the respiratory pause, it is possible to produce slight respiratory motions. From this, as well as from the analysis of the tremor and of the blood pressure curve, the authors conclude that these phenomena are independent of the cerebral cortex, but that they are regulated by bulbar or spinal centers.

Mediastinal Displacement with Infiltrative Pulmonary Diseases in Infancy.—F. Thoenes (*Monatsschrift für Kinderheilkunde,* July, 1922) finds that a considerable displacement of the mediastinum not infrequently occurs toward the side of the diseased and infiltrated lung. This is to be attributed to the difference in pressure in the pleural spaces. This difference is the result of the deficient development of the elastic fibres in the infantile lung and the development of atalectasis, which is always present and results from the diminution in volume of the lung on the diseased side; this is not corrected even with expiration.

Backfire Fracture.—A. H. Bizarro (*Annals of Surgery,* July, 1922) states that the lower third of the radius and ulna is the commonest seat of backfire fracture, and the carpal bones the next common. The crack through the epiphyseal line of the radius is the commonest type of single bone lesion. The ulna styloid tip and radial epiphyseal line are the commonest types of double bone lesions. The scaphoid is the commonest carpal bone involved. In individuals under twenty years of age the diagnosis of ulna styloid fracture is more difficult owing to the common occurrence of irregularities of ossification. In twenty-five per cent. of the cases of the series the injury of the wrist was limited to the soft parts. The upper end of both radius and ulna are occasionally the seat of fracture. The age of the individual has no bearing on the fracture being at the epiphyseal line. The great bulk of these injuries is of the indirect type. The prognosis is usually good.

Shoulder Pain.—Z. Cope (*British Journal of Surgery,* October, 1922), in speaking of phrenic shoulder pain, concludes that pain of a referred nature is frequently felt on the top of the shoulder as a consequence of stimulation of the sensory terminals of the phrenic nerve in or near the diaphragm. The pain is felt in some part of the segmental areas corresponding to the third and fourth, and sometimes even the fifth cervical segments of the spinal cord. This referred pain is met with in many conditions which cause inflammation or irritation of the diaphragm or contiguous structures. There is an important localizing correspondence between the part of the diaphragm irritated and the position of the referred pain on the shoulder.

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Miscellany.

Spinal Cord Compression Due to Circumscribed Serous Meningitis.—E. Sahlgren (*Hygeia,* August 16, 1922) reports the case of an elderly female with signs of hypertonia and arteriosclerosis, who, after an injury to her back, developed progressive paraparesis of both legs which was of a spastic nature in the beginning of the disease combined with paresthesia of both legs, but without root pains or disturbance of sensibility. Little by little symptoms also manifested themselves in the hip joints with bladder and rectal disturbances.

The clinical symptoms pointed to injury of the spinal cord. Patient recommended for operation; diagnosis: extramedullary, compressing tumor at the level of the eleventh vertebra. Laminectomy was performed. No tumor palpable. Incision of the dura revealed several osteoid patches in the arachnoid, the lowest of which at the level of the eleventh vertebra adhered to the dura, and on incision of the dura at this point the spinal fluid gushed out in greater amount and at increased pressure; the veins in this vicinity were much dilated. The osteoid patches were excised and the dura closed. Histological examination revealed no signs of inflammation or tumor formation. Immediately after operation the patient's condition seemed promising, but after about ten days the urine became scant and of high specific gravity, the heart grew weaker in spite of energetic stimulation, bronchopneumonia set in and the patient died on the thirteenth day after the operation. Autopsy showed renal and general sclerosis. Marked arteriosclerosis of the brain with moderate internal and external hydrocephalus. The cord showed no pathological changes microscopically and a section through the cord at the point where compression was suspected showed no histological change. The author believes it possible that the hydrocephalus and diffuse serous meningitis may have been caused by the trauma. A similar case is described by Bittorf (*Münch. Med. Wochenschr.,* 1916). Negative histological findings were reported also in similar cases. The symptoms were probably due to circulatory disturbances in the cord which left no permanent pathological anatomical change. We may therefore safely assume that in this case we were dealing with a case of circumscribed serous meningitis causing spinal cord compression, and also with a diffuse serous meningitis, both related to trauma.

Carcinoma and Pregnancy.—Friedrich Wolff (*Zentralblatt für Gynäkologie,* May 13, 1922) states that the opinions regarding the question whether pregnancy affects a uterine carcinoma favorably or unfavorably vary. In fourteen cases of carcinoma, which developed during pregnancy or the puerperium, eleven patients were twenty-five to forty years of age, which amounted to ten per cent. of all the cases of carcinoma seen in young persons (up to the fortieth year of life) during the same period of observation (one year). This finding does not support the view that pregnancy favors the development of carcinoma. In six cases, in which the carcinoma developed during pregnancy, only two were inoperable at the ages of forty-two and thirty-four. In the four operable cases, one showed a glandular recurrence after 2.25 years, three remained free from recurrences at the ages of twenty-nine, thirty-one, and thirty-nine years. Of the eight cases showing carcinoma immediately after the pregnancy, two were already inoperable at the ages of forty-three and thirty-six years; of six patients operated upon, one died immediately after the operation, three showed rapid recurrences at the ages of twenty-five, thirty-one, and thirty-nine years, and two remained cured at the ages of thirty-nine and forty-six years.

From these findings the author draws the conclusion that pregnancy has neither a favorable nor an unfavorable effect on carcinoma, and also that the age of the patient has no determinable influence upon the operability or danger of recurrence. He believes that there are benign carcinomas and also particularly atypical, rapidly progressive tumors, that the benign and malignant characters are biological variations of the tumor, depending upon their sources of origin and their blood supply, and that coincident circumstances, such as pregnancy, play only a subsidiary and possibly an undecisive part in the final outcome. Carcinoma is recognized more easily and promptly during pregnancy simply because pregnant women seek medical aid much earlier than nonpregnant women.

Cause of Hyperemesis Gravidarum.—Felix Ranzel (*Zentralblatt für Gynäkologie,* June 10, 1922) combats the theory that hyperemesis gravidarum is an expression of aversion and disgust and the reaction of the unwillingness of the woman to becoming pregnant. He substantiates his claim by the immediate cessation of the vomiting after indifferent remedies like the insertion of a pessary. This gainsays the psychogenic theory. Besides, necropsies occasionally show anatomical changes in the liver similar to phosphorus and fungus poisonings, in which cases toxic effects must be assumed as etiological factors.

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On Diagnostic and Therapeutic Importance of Some Typical Tender Bone Points*

By RAFFAELE BASTIANELLI, M.D.,
Rome, Italy,
Professor of Clinical Surgery.

A great number of persons, especially women, complain of pain in various parts of the body, of which it is difficult to establish the seat and the nature, and consequently they are treated as suffering from nervousness, neuralgia, hysteria, or from material diseases of organs or parts of the body in the neighborhood of the pain, e. g., loose kidney, intestinal neuralgia, chronic appendicitis, arthritis, or periostitis.

For some years it has been an unlooked for privilege of mine to see a number of such patients, and, sometimes attracted by their report which evidently pointed to the seat of the pain, sometimes guided by the physical examination, I have been led to pay a great deal of attention to the bones as the possible location of the pain; and, as the treatment instituted, directed toward the affected bone, has been successful I have become fully persuaded that I was on the right track, and after years of observation I believe I can look at many different painful conditions from a general point of view which I venture to synthetize with the name of typical tender bone points, that is, of painful conditions associated with tenderness of some typical bone points. I prefer to give to these conditions the name of typical tender bone points to avoid entering into the essence of the thing and not to prejudice the question in any way, before a careful study may bring it to a satisfactory solution.

I call these points typical because they are constantly in the same spot, and so very well defined and accompanied by the same symptoms, more or less intense, that once you know them it is impossible to make a mistake. Some are infrequent and in various places—those are atypical. The patient rarely locates the pain at the proper spot, but generally indicates it in an indefinite way, so that it appears to come from a distant source. The patient seems to be unconscious of the bone as being the seat of the trouble. In some instances the pain is recognized and properly located by the patient. The common origin of the pain is in the apophysis, and precisely at the insertion of ligaments or capsules or fibrous muscular attachments, hence the names of apophysalgia, epicondylalgia, or epicondylitis—names which are better avoided since we do not know anything definite, and since the same painful points are to be found on flat bones like the ribs or their cartilages, the scapula, the pelvis. It is typical that the tender spot is extremely well circumscribed so that the pain can be found with the edge of the nail. By pressure outside of this small area no pain is felt. The moment you reach the vital point the pain is vividly expressed, and in many instances the patient tells you clearly that the source has been reached. From those points the pain radiates to a distance, sometimes following paths that are not definitely traceable along the nerve trunks or branches. Sometimes the pain is felt more in the immediate vicinity, sometimes it is accentuated during certain movements. The pain may be constant but variable, or at intervals, or have a neuralgic character if it comes by attacks.

The initial symptoms are not frequently acute or sudden and continuous, but more obscure, indefinite, insidiously growing with time. The pain is felt as dull, boring, tearing and spreading and commonly worse at night. It may prevent or disturb sleep and disable a limb or completely prevent work. The course of the disease is variable, usually obstinate, and sometimes with free periods. It often lasts for years. It is easy to conceive that if such a painful spot bears a relation to a neighboring structure, like a joint, for instance, the pain may be attributed to a disease of the joint; or if near tendons or nerves, to them. If the bone point has not been looked for, and if the relation is such as to make one think of an abdominal organ, say the kidney or the appendix, the pain will be certainly attributed to it. Following that, I believe it logical to group the painful points into those which may give reason for con-

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*The Wesley M. Carpenter Lecture, delivered at the New York Academy of Medicine, October 5, 1922.

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fusion with diseases of joints, nerves, and tendons, and those which may be confused with visceral diseases.

The first time I saw such a case was twelve years ago. A woman of middle age complained of intense pain in the right shoulder, anteriorly, spreading to the scapula and arm, tearing and pulsating at times, which had appeared in a rather acute way three months before, growing with time, being intense in the night, and preventing sleep and some movements of the arm, so that she preferred to keep it immovable. She had been treated for arthritis of the shoulder for a long time without success, and it was finally decided that she was suffering from chronic rheumatic arthritis. The examination showed that the shape of the shoulder was not changed; the right deltoid was slightly, if any, less in bulk and in power of contraction than the left, and pressing along a horizontal line under the acromion, that is, on the socalled interarticular line and along the bicipital groove, there was no pain at all, but the pain was intense and unbearable by pressing deeply on a point on the anterior border of the deltoid, close to the pectoral deltoid interstice, under and a little outside of the coracoid process. The point was constant and could be limited exactly to a small area, outside of which no pain at all was experienced. The active movements were possible but the outward and backward were made cautiously and limited. By impressing passive movements to the joint, holding down the shoulder, and sustaining the elbow in such a way that no stretch at all was put on muscles and ligaments, the movements were all possible and painless, but it was difficult to force the outward and backward rotation.

The radiograph was negative. By putting the head of a metal probe on the spot it could be seen under x rays that it corresponded very nearly to the smaller tuberosity. I was impressed especially by the disproportion between the severity of the pain and the possibility of the movements, by the absence of swelling and of muscular wasting, and then I began to pay attention to the only fact discovered—the pain at that point. With the help of the experience gained in other similar cases, of x ray pictures, and of anatomical preparations, I have determined that the point is situated just outside the capsular insertion, close to the limit between the small tuberosity and the anatomical neck, where are attached the joint capsule and the inferior fibres of the coracohumeral ligament. It is quite well known, and has been for a long time, that in the course of shoulder arthritis there is a tender point under and outside the coracoid. It is given also as a differential symptom of such a disease, and interpreted as corresponding to the convexity of the head of the humerus (Duplay, Rochard, Demoulin). But this is not accessible unless the arm is in a forced outward rotation; instead, this maneuvre is not necessary to find the painful point of which I am speaking. The same authors say that in the arthritides pain is to be elicited in the deltoid pectoral interstice, and, as they do not speak on that occasion of any maneuvre of rotation, certainly the painful area is that which I believed it to be, that is, not the articular portion of the head but that limited area near the anatomical neck.

The same painful point is described as being present in a variety of arthritides, socalled traumatic, in which, notwithstanding the great authority of Sir Robert Jones, I believe the traumatic element has very little to do, unless we call traumatism the use of the joint, but certainly it may be during an exaggerated or forced movement that the pain is first experienced as being the occasional cause of putting into evidence the initial stage of the disease due to some other influences. But laying aside that discussion, I will recall also that the same painful point is described in the socalled subcoracoid bursitis. This bursa is, in Europe, disregarded as being too small to give any source of trouble (DeQuervain) but recently Goldthwaite and Codman have so very interestingly attracted attention to it that I think it would be unfair to such authors not to remember it. I have had no experience with this disease, neither have I heard it mentioned anywhere in our country, but for my purpose it is enough to ask why the same painful point is once attributed to the intraarticular portion of the head of the humerus, why another time to the inflamed bursa, or to a deep part without precise location? Is it not simple to accept my assertion that it is always the same area which is the seat of pain, especially when you can demonstrate it anatomically and confirm it clinically by the success of treatment?

So much for the diagnosis of its location. But as a symptom of disease, what is its value? It is of secondary importance in the diagnosis of arthritis, as there are far better signs, but it is of greater importance in establishing a new entity, the one of the painful bone point, as existing by itself, giving origin to radiating pains and to be differentiated from other diseases.

In case of the existence of this point on the humerus (which I will call humeral superior point) the differential diagnosis is first concerned with the arthritides, as the location of pain and the impairment of some movements, commonly bring us to such a diagnosis. If one pays attention to the shape of the shoulder, to the condition of the muscles, to the possibility of impressing any movement to the arm when capsule and ligaments are held relaxed, except the outward backward rotation as being the one which stretches such structures, and the presence of only this painful spot, the diagnosis is easily accomplished. I have seen many instances of incorrect diagnosis going even to that of tuberculosis. Many socalled homalgias, arthralgias or neuralgias of the joint, deltoid and humerus are due to the same cause. The same pain, when it is running in the arm with indefinite location along the nerves, is called brachialgia. This is especially true when the humeral superior point is associated with points on the fourth and fifth ribs posteriorly, between the medial margin of the scapula and the spinal column, and also with scapular points, on its spine medially, or on the medial angle. When the physical examination, including the x rays, has excluded the many lesions which may give rise to the brachialgia and when these bony points are distinctly found, there is no doubt that they are the source of pain, as it is proved by the result of the appropriate treatment.

The socalled osteoperiosteal neuralgia is definitely different for it consists in pain in the shaft of the long bones, usually in the upper part of the humerus under the surgical neck, occurring mostly during the night and without any tender spots, as I could see, in two typical cases.

The styloid process of the radius is a common painful point. The patients, usually women, do not locate the pain in the bone, but vaguely near that area. Usually they complain of pain during ulnar and dorsal flexion of the hand, in abducting the thumb, in grasping and in raising a weight. The pain radiates along the thumb, the radial, dorsal side of the hand and of the forearm, even in the arm, and some persons are incapable of doing any work, even playing the piano or sewing. The location of the pain is definitely on a limited point just at the tip of the styloid, and nowhere else. There is no change of shape in the wrist and the movements can all be accomplished if not forcibly done. I have seen cases treated as arthritis, with immobilization, and with no result, though rest improves the condition greatly. The differential diagnosis is easily made by paying attention to the previously described signs and especially to the disproportion between the pain, severe at times, and the possibility of movements, and to the localized small spot of tenderness.

Periostitis, osteitis, neuralgia of the joint, inflammation of the tendon sheaths have also been common diagnoses. These false diagnoses are easy to avoid by remembering the peculiarity of the painful bone spot.

De Quervain some years ago described a peculiar disease in the wrist called tendovaginitis stenosans, and Keppler and others seem to have confirmed it. Permit me to remind you that the author described it as a relative narrowing of the tendon sheath of the extensor brevis and abductor longus pollicis, and not an inflammation, because he could not detect any sign of it but only a thickening of the sheath. It appears mostly in women and the pain described is exactly the same as I have told you for the painful point. Clinically he found a pressure pain and usually a certain thickening corresponding to said sheath. In laying it bare one can see the tendons choked, as it were, and cutting the tendon with a tenotomy knife, subcutaneously, the patient was cured forever. I have never seen such a thing and I do not dare to doubt it, but I may be allowed to think that the tender spot may have something to do with it, if not always, at least sometimes. I ask you to think of the similarity of the symptoms, of the inexact location of the pain as given by De Quervain, of the frequence in women, as in my cases, notwithstanding that they work less hard with their hands than men. Then I ask you to think of that strange pathological entity of a narrowing of a tendon sheath, a disease of which we have no other example in the body.

After having expressed these ideas I may briefly mention the socalled epicondylitis, epicondylalgia, which has been known for a long time and variously interpreted, as due to laceration or stretching of the external ligament of the elbow, to a stretching of the radiohumeral capsule, to a neuralgia, to an inflammation of periosteum or a bursa, and so forth. I believe that the exact localization of the pain is in a limited spot of the epicondyle just at its anterior point, in view of the absence of any material sign of lesion in the joint or in the muscles. The sometimes spontaneous onset indicates an essentially tender bony point, and I will dismiss this as well acceptable, avoiding the discussion of it as probably too tedious. Other painful points in the upper extremity may be found on the styloid process of the ulna, on the bases of the metacarpal bones first and second, on the os pysiformis.

In the lower extremity the bony spot most interesting is the one situated on the internal tibial condyle, anteriorly, about midway between the middle and the internal line of the knee, and exactly on the infraglenoid margin. This point is just outside the insertion of the capsule, probably where are attached fibres proceeding from the internal patellar retinaculum and passing down to the tuberosity of the tibia. This point has nothing to do with the one often found on the insertion of the internal lateral ligament. The pain spreads on the internal side of the knee and is likely to become worse during exertion so as to prevent free movement and to cause vague alarm. I have seen many patients suffering from that pain and treated for rheumatism, for arthritis of the knee, tuberculosis of the internal condyle, and other conditions. But the physical examination showed the integrity of the joint, the possibility of movement being complete when the capsule and ligament were not put on the stretch. The radiograph showed a normal bone and the pressure showed only a limited painful area. This point I wish to call the tibial superior. I need not dwell on similar pain, well known, on the attachment of the lateral ligament of the knee occurring in true diseases of the joint, which, like the one mentioned, may be present in the true arthritides like the humeral superior point in the shoulder joint inflammation. But those may also be independent and generally the error is made that when one finds pain either on the tibial point or on the ligamentary insertions, one thinks of the joint and not of the bony spots as being the seat of the disease.

I wish also to mention the painful spots, on the head of the fibula, on the external tibial and femoral condyle, on the margin of the patella, on the apex of the malleoli, on the internal side of the navicular bone, on the dorsal aspect of the base of the second and third metatarsal bones, and on the plantar surface of the head of the fourth and third metatarsals, on the posterior and on the inferior surface of the calcaneus. I will not venture to say that many of the socalled achillodynias, podalgias, metatarsalgias, and especially the Morton painful foot, and the tarsalgia of some young people in which the navicular bone is extremely tender, are due to some painful bony spots, but I am sure there is ample room for an exact differential diagnosis and that in many cases it is only the tender bony spot which is the cause of the suffering, as is amply proved by the result of the local treatment.

I have already spoken of the ribs as the seat of pain which is located on the fourth and fifth posteriorly between the scapula and the vertebral column and associated with tender scapular spots and with symptoms of indefinite brachialgia. The point situated on the inferior costal border is also important. When on the right side and corresponding to about the place of the socalled cystic point, this gives rise to the diagnosis of biliary colic, of hepatalgia, and also to the removal of the gallbladder, without any cessation of the pain, which was promptly ended by the local treatment. The painful tip of the eleventh and twelfth rib also gives rise to many diagnostic errors.

The spinal column has been long known as the seat of pain not in relation with material lesions. I need only to recall the hyperesthetic spine of neurotic people, of hysterical women, in which the pain is described variously by different authors. As, for instance, Gowers says that pain is felt through a considerable vertical extent of the spine, and is especially intense in certain spots, usually in more than one. The dorsal region is the most common seat, next the lower cervical, and least frequently the lumbar region, sometimes on one side of the spine close to it. Oppenheim speaks in about the same way, pointing to the hyperesthesia of the skin above the painful spines. He notes also that there are pains deeply located, apparently on the muscles, in the fascia, or on the periosteum. There are certainly true hysterical patients having such pains, but there are also others who have tender spots located exactly on the tip of one spine, without skin hyperesthesia, from which the suffering begins and spreads in various ways. To dispose of these people as neurotic seems to me excessive. The exact study of the matter and the result of treatment have persuaded me of the existence of such tender bony spots as the only cause of the pain, and independent upon hysteria.

The seventh cervical, or prominent, spine has given rise to errors. In two girls having that spine more pronounced and intensely painful the diagnosis was tuberculosis of the spine and the plaster of Paris jacket was carried vainly for a long time. When appropriate treatment was instituted they were quickly cured. Chipault has described such pain in cases of Pott's disease and not in relation to the carious process. This socalled apophysalgia is of great importance for we may be easily brought to a wrong conclusion. I believe that pressure tenderness on the spine is not at all characteristic of Pott's disease —but only the pain produced by trying to displace the spine from side to side. I believe that pain on the tip of one or more spines is not due to caries, but to this special painful condition of the bone, as it is proved by the local treatment (Chipault). We have far better signs than this for such a diagnosis, and now the x rays are of such help that it seems easy to reach a right conclusion. When an essential spinous tender spot is present there is always free mobility of the column and no contraction of the muscles, if the movements are made to avoid a sudden stretching of the ligaments. Besides, the limited, precisely definite area of pain is for me of deciding importance. The point apophysaire described by Trousseau and denied by others as existing in the intercostal neuralgias, the painful spinal points described in the course of liver and gallbladder disease by Charert, Vidal, Mackenzie and others, certainly deserve attention, but there is the possibility of confusion with the true bony tender points.

The sacral region and the posterior iliac spine close to the sacroiliac joint, also often the seat of limited pain, which may radiate in the buttocks, along the thigh, and may simulate various diseases, like sciatic neuralgia, sacroiliac joint stretching, lumbago, backache of indefinite location and origin, and so on. In every case of such indefinite pain the accurate search for a tender bony spot may at once make the diagnosis and the treatment easy. What a place, according to such ideas, the socalled coccygodynia takes is easy to understand. In such cases there is always a limited tender spot, generally at the very tip of the coccyx, from which the pain radiates, as you well know. The painful spot located on the tip of the lateral process of the third lumbar vertebra has to be considered with more detail. So far as I know such a pain has never been described. I know only of Nicoladoni having pointed to the pain present on the fourth lateral lumbar process during lumbago. This is true, and often there is pain on both sides, and even on the second and third processes, in those cases. But the one I speak of is independent of any other disease and such that only the physical examination does reveal it. The patient generally locates his pain vaguely in the back and complains of pain spreading in an indefinite form along the waist, running anteriorly to the iliac fossa. Women are mostly affected by it, and rarely is a cause to be found. In some the onset is sudden and acute. A lady of fifty years, unmarried, seen by me in 1914, reported that she had been suffering for four years. One day while running up hill she was seized by pain in the right loin so severe as to almost make her faint. The pain continued severe for five days, then subsided but never stopped, and at that time was growing more intense, at times less, but especially in bending and during exertion it was more severe. She was a thin, pale woman, and nothing could be detected but a painful spot on the tip of the third lumbar lateral apophysis. With local treatment she was quickly cured. This is an exceptional occurrence and points more to a traumatic origin, but in the majority of cases the trauma is not to be found, though sometimes there is a rheumatic influence.

The characteristic part of such an affection is that the patient is unaware of the bone point and refers the pain to the posterior side, to the flank, and to the abdominal inferior quadrant, with a more anterior tender point vaguely located about the middle of the iliac fossa; the pain may be in the form of attacks, and during exertion or even in the night. Recently I saw a strong peasant coming back from America because he could no longer do heavy shovel and pickaxe work on account of pain arising in the right loin. He had been vainly treated in many ways. He reported that he had suffered from it for many years and he could not remember the cause of it. There was only pain in that peculiar point of the third lateral lumbar process, which when pressed was at once recognized by him as his particular pain, and he was cured by the local treatment.

Certainly the most common sufferers are women, thin, generally neurotic, others fat and apparently normal, and it is possible perhaps to attribute such a pain in some cases to efforts, in some to rheumatic influences, but generally it appears as idiopathic. During the examination of these patients, which is best made in the lateral posture, often one may find another painful point anteriorly and deep by pressing against the lateral side of the body of the fourth lumbar vertebra. This is an exquisite pain, and sometimes it is to be found on both sides. Let us call it anterior lumbar pain in opposition to the posterior one described. The fourth vertebral body is the most frequently affected, but sometimes the third.

The posterior pain generally gives rise to the diagnosis of backache, or of lumboabdominal neuralgia, or of loose kidney, or nephralgia, or neurosis, and I have seen many women operated upon by fixation of the kidney and not cured. Certainly I have seen the pain present in rare cases of true kidney disease, but the physical examination, the study of the urine, ureteral catheterization, and x ray examination clear up the diagnosis, and then when all investigations are negative and the painful spot is present one may be sure of being on the right path.

It is more difficult to get rid of the errors arising from the pain of the fourth lumbar body, for when we enter into the great field of abdominal pain and consider the many possibilities we feel really embarrassed in many instances to reach a conclusion. Generally in those cases the diagnosis is made of chronic appendicitis, of painful cecum, of enteralgia, or simply iliac algia, which name is very well selected to cover our ignorance. I shall not dare to trouble you with the vexed question of the chronic appendicitis and of the painful abdominal spots in relation to it. If one would map out on a scheme of the human abdomen all the painful points described in connection with appendicitis, or of enteralgia, or of pain of the celiac plexus, of the aorta, of the iliac arteries, and other organs, one would get a map like that of a starlight sky, but these stars unfortunately do not give any light to the man who wishes and needs a clear sight in such profound darkness.

Those points do not work, do not help, but in a secondary way and it would be better not to be led by them alone in diagnosis, and I am persuaded that many of them have been worked out from preexisting ideas and artificially. Dr. Morris, of this city, has drawn attention to a painful point located deeply at one and a half inches from the umbilicus on the spinal umbilical line, on the right side, and due to irritation of sympathetic ganglions during the course of what he called the protective appendicitis, or the syncongestive appendicitis. If the pain were bilateral he thought it was a sure sign of pelvic affection, if only on the right, a sign of appendicular trouble. This pain really exists, but it is a pain located on the bone, and it is just the one pain I have spoken of. You need not search for it at one and a half inches to the right of the umbilicus. It generally happens that, when examining a patient for tenderness in the iliac fossa, as soon as the hand begins to go deeper and the finger unconsciously to stretch a little way medially, they meet the lateral side of the fourth lumbar body, press it and elicit the pain, which if not accurately studied, is at once pronounced to belong to the appendix. I do not give to this pain any importance as being positive for the diagnosis of appendicitis. On the contrary, I am persuaded that it has nothing to do with it, even if inflammation of the appendix should eventually be present. Then it would be only a coincidence. This pain is found almost exclusively in women having even no pelvic ailment, more to the right, and the question is open whether it is a hyperesthesia of sympathetic fibres made evident by the pressure against the lumbar body, or whether it is an exquisite hyperesthesia of the periosteal surface of it, as are all the other bony points already described.

The anatomical and etiological foundations of such a lesion are not definite. It occurs commonly without any anatomical lesion, and the macroscopical investigation of fragments removed by operation have not yielded appreciable results. Apparently there is not a common osteoperiostitis, neither a socalled angioneurotic periostitis for we never see sudden infiltration appear and disappear. Minute studies on the sensitive termination of nervous filaments in the ligamentous attachments to the bone in those spots have never been made.

Do we know anything better of sciatica, and the other neuralgias? Is it possible that the socalled traumatic, rheumatic, gouty, neurotic elements have some rôle in the production of this lesion? Recently I have seen a man with epicondylic tender points, bilateral, of long standing, have a sudden exacerbation and develop swelling of the left wrist joint, in the absence of any demonstrable affection, which was improving under antigout treatment. Is it possible that indefinite infective causes, or, as Adams called it, subinfection, could produce it, as we believe are producing the socalled chronic rheumatic affections and fibrositis? These are open questions.

But one thing is sure, that there is a local treatment most effective, that is the injection of ten to twenty minims of carbolic acid in the strength of three or five to one hundred, injected deeply on the very bone exactly in the painful point. The injection must be repeated four to five times at different intervals according to the reaction. In the chronic cases, especially of the superior humeral, superior tibial, posterior lumbar, and rib and scapula points, the results have been extraordinary; less in the epicondyle and styloid pain and in the coccygodynia, perhaps because it is more difficult to inject them well. In the acute form I generally wait, but at the request of busy patients I have sometimes performed the injection with variable results, as the reaction following in those cases is more severe and the disease for the time being becomes worse. It has been a source of satisfaction for me to read in Llewellyn and Jones's book on fibrositis that Wilfred Harris has cured brachialgias by injecting alcohol on tender points accurately localized on the scapula and on the ribs. Certainly Dr. Harris was in the presence of such cases as I have described, and to find that two independent persons move along the same way is a reason to believe that it is the right way. At any rate, the many therapeutic results obtained by me and by others in Rome, with only such a local treatment are the best proof that these painful bone spots are a real independent entity.

Morgagni wrote that the more frequent a disease, the more essential it is that its phenomena should be carefully investigated and, if possible, linked up with some structural changes in the body textures. Unfortunately I have been very far from accomplishing such an ideal, nor does it seem possible now. What I have presented is a small part of a large field, that of pain, a study most difficult and complex.

I have endeavored to submit this small part of it for your consideration, presenting it from a general comprehensive point of view, as I believe it has not been done before.

A New Method of Treatment of Irreducible, Acquired or Congenital Hip Dislocations

By ADOLF LORENZ, M.D.,
Vienna.

Although having quite a different etiology, the following conditions, luxations, pseudarthrosis colli femoris, coxa vara luxans, anatomically have something in common. From this anatomical similarity there arises a nearly equal disturbance of function in these otherwise different conditions. Similar functional disturbance suggests similar, or rather identical, treatment.

What is it that these different conditions have in common anatomically? Evidently a loosened connection of the upper end of the femur with the pelvis. In cases of inveterate luxations of whatever character, this connection is effected by the distended capsular tube. The same is the case in ununited fractures of the neck of the femur, though the pseudarthrotic fibrous tissue between the fragments of the neck more or less adds to the tightness of the loosened connection of the pelvis with the upper end of the femur.

This relatively increased tightness of connection in the case of ununited fracture of the neck of the femur accounts for the fact that even in very loose pseudarthroses the dislocation upward of the peripheral fragment never will reach degrees usually seen in inveterate luxations.

The ligamentum teres does not count in either case: in the case of inveterate luxation it has been destroyed, and in the case of pseudarthrosis it is not put to strain.

The inveterate congenital luxation means displacement upward of the entire upper end of the femur, while pseudarthrosis colli femoris represents displacement upward of the upper end of the femur, minus the head which is retained in the acetabulum.

In cases of socalled pathological luxation of the hip joint, when the head of the femur has been destroyed either by a tuberculous or osteomyelitic process, the similarity to pseudarthrosis is still greater. In both cases the upper end of the femur minus the head is luxated upward, the only difference being that the displacement upward in pseudarthrosis of the neck is less, and that the head is left in the socket.

In cases of severe coxa vara, when the neck of the femur is depressed under the horizontal line forming an acute angle with the shaft of the femur, the head of the femur necessarily develops a tendency to subluxation; therefore the name, coxa vara luxans. Also, in these cases, though in a lesser degree, the connection of the pelvis with the upper end of the femur is impaired. The functional disturbances caused by such similar anatomical conditions consequently are nearly the same.

The pelvis in all these cases has lost the direct bony support of the femur; it is no longer propped by the bony pillar of the femur, but is merely suspended at its upper parts by soft and yielding tissues, the capsule and the pelvitrochanteric muscles. These soft parts, subject to undue strain especially in adults of heavier weight, become painful.

I used to call these pains the tearing or distention pains (*Zerrungs Schmerzen*). Such pains at times totally disable the patient. At any rate, they considerably interfere with the endurance in walking.

The limping of such patients is due not only to the deficient bony support of the pelvis, but also to the fact that the power of the pelvitrochanteric muscles is deficient, for by the shortened distance of their points of insertion they have become too long, have lost their normal leverage, and beside are weakened from disuse. They are no longer able to hold the pelvis in the horizontal line when the diseased leg has to support the trunk. The contralateral side of the pelvis drops until the lateral aspect of the tuber ischii reaches contact with the inner aspect of the upper femur. Though this contact is not a bony one, the cushion of the soft parts between the bones steadies the pelvis and prevents its further dropping down. I mention this fact intentionally, because a therapeutic measure of which I shall speak later on has been founded upon it.

The lateral dropping of the pelvis at each step accounts for the adduction contraction met with in all these cases. Habitual adduction induces flexion contraction, which furthermore is favored by the fact that the dislocation of the upper end of the femur takes place not only in an upward but also in a backward direction.

The concomitant outward rotation of the thigh is of no practical—rather of a theoretical—importance. It is a sign of the loosened connection of the pelvis and femur, which allows the thigh to follow its own weight.

I must lay stress on the fact, which has always been overlooked, that the conditions named above, comprising much of the pathology of the hip joint, always are complicated by flexion adduction contraction of the thigh. (I omit outward rotation because it is of less importance.) Nearly all pathological conditions of the hip joint, with few exceptions of no interest in the present matter, offer at the end of the course of the underlying disease the same contractions of adduction and flexion. Therefore I am accustomed to denominate flexion adduction as the socalled typical contraction of the functionally deficient hip joint.

This fact offers a point of attack of which I have made use especially in cases of pseudarthrosis colli femoris and inveterate luxations. It stands to reason that merely by correction of this concomitant contraction some good can be derived. But such correction alone means only symptomatic treatment, because it does not solve the question of the pathological suspension of the trunk and the pelvis on the femur.

Since the day when I had to recognize the fact that there are, in many cases, certain insurmountable limits to bloodless reduction of the congenitally luxated hip joint, it has been a pet idea of mine to cause the femur to make a side way, or detour, to reach the acetabulum, instead of passing by, when it had become impossible to reduce the head into the socket. Then the elastic and yielding suspension of the pelvis, i. e., of the trunk, at the upper end of the femur, would be changed into a bony support of the pelvis by the femur, that is, by that part of the femur which is opposite the acetabulum.

To be able to make this side way, the respective part of the femur first must be isolated by a cut of the bone at the level of the socket. Then the upper end of the lower fragment would represent, as it were, a newly created artificial head, to be placed in the socket instead of the real but irreducible head; this latter would remain where it was; the lower end of the upper fragment would be united with the lower fragment by bony tissue. Thus the upper end of the femur would be transformed into a fork with two unequal teeth or prongs. This would be effected by an osteotomy of the upper end of the femur and by the displacement of the lower fragment inward against the capsule covered socket, while the lower end of the upper fragment by adduction would be brought into contact with the upper end of the distal fragment below its insertion into the socket.

The long blunt tooth, or prong, is represented by the head and the great trochanter; the short but pointed tooth by the upper end of the shaft of the femur. Therefore, I call the procedure bifurcation of the upper end of the femur. This nomenclature was chosen because of its shortness as well as descriptive significance.

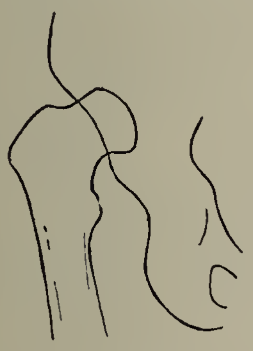

Fig. 1a.—Irreducible hip luxation.

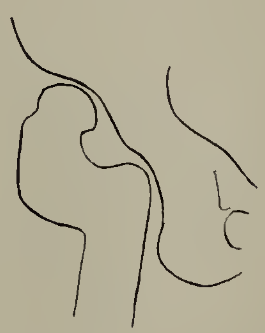

Fig. 1b.—A diagrammatic sketch embodying the idea of the operation, which means deflection into the acetabulum of that part of the femur which is at a level with the socket. As it were, the femur makes a side way to reach the socket, instead of passing by it at a distance.

To characterize more clearly the operative procedure I could have preferred the title: Reduction into the acetabulum of that section of the femur which is at a level with the middle of the socket. This would have been a description rather than a name for the procedure.

But using the name bifurcation, it must be borne in mind that the characteristic feature of the process is reposition, or reduction of a newly created head into the socket. I must emphasize this fact, because I expect that—propagators of subtrochanteric osteotomy in cases of irreducible hip dislocation will say that there is nothing new about my bifurcation.

As far as the osteotomy is concerned (although there are quite remarkable peculiarities in bifurcating osteotomy) that may be true. But osteotomy in bifurcation means nothing but a preparatory act to the reposition of an artificially created head.

Simple subtrochanteric osteotomy as recommended by Kirmisson means nothing else than correction of flexion adduction contraction of the thigh. I have always objected to this method because the same, or an even better effect, can be brought about by my bloodless procedure of inversion, as I will explain later on.

Beside correction of the contraction, v. Baeyer, of Wurzburg, had still another aim in mind when he proposed subtrochanteric osteotomy in these cases. He advocates strong abduction of the lower fragment. When, after bony union of the fragments, the distal one is put in an indifferent position, the upper end of the proximal fragment, i. e., the trochanter major—must become more removed from the outer aspect of the iliac bone. Consequently the pelvitrochanteric muscles become stretched, their points of insertion become further separated and their leverage improved. But this does not mean reposition of an artificially created head of the femur.

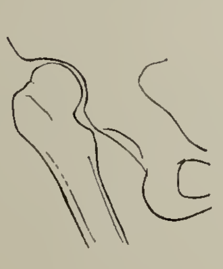

Fig. 2a.—An irreducible hip dislocation.

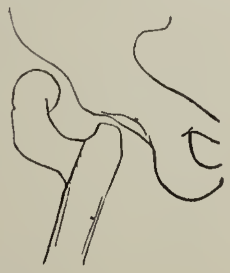

Fig. 2b.—(An outlined x ray picture) shows how the theoretically construed deflexion of the femur looks in reality a short time after the bifurcation operation. The upper end of the distal fragment—after oblique osteotomy—has been reduced into, or rather on the socket, by abduction and other maneuvres; the lower end of the proximal fragment, by adduction has been brought in contact with the distal fragment underneath the new artificial head, and will be united at this place by bony tissue. The upper end of the femur suggests a fork with a blunt, long prong (head and trochanter major); and the short, pointed prong (shaft of the femur) on the acetabulum.

A third subtrochanteric osteotomy, a little lower down, at about the level of the tuber ischii, has been recommended by Schanz, of Dresden, quite recently. By choosing this place in correcting adduction and flexion into abduction and extension he has in mind the elimination of the Trendelenburg-Lorenz[1] symptom by keeping the upper part of the femur in strongest adduction to the pelvis while correction of this position is performed at a lower level opposite the os ischii. This idea has a sound foundation, and I dare say that I considered its possible efficiency many years ago on my way to bifurcation. But this

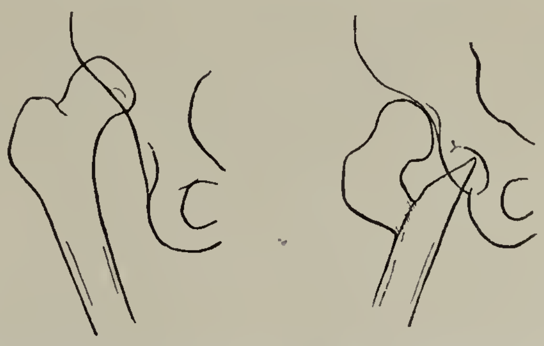

Fig. 3.—The same explanation (Fig. 2b.) holds true. The left sketch represents an irreducible traumatic hip dislocation. The outlined x ray picture on the right side shows the anatomical result of the bifurcation.

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[1] Some pupils of mine added my name to that of Trendelenburg because this symptom coincidentally and independently had been described in my book on congenital dislocation.

Schanz osteotomy, also, is far from sharing any feature with bifurcation.

I may rightly state, then, that bifurcation is a completely new operation of a quite distinct character, and this character is reposition—surely not of an irreducible head, but of a substitute head, created by the preparatory act of osteotomy.

I have often met with difficulties in making the idea of the bifurcation operation quite clear to many who have asked me about it. In order clearly to differentiate bifurcation from simple osteotomy, and to explain the idea of the operation, I have made diagrams, which are outlined x ray pictures.

After having explained the idea of the bifurcation operation, I hasten to add that I am by no means of the opinion that the operation should be performed indiscriminately in any of the above described conditions. On the contrary, we must carefully select the cases. The principal inducements to operate upon a case are inability to walk or unendurable pains. I would not advise the operation for cosmetic considerations, although the cosmetic results of the operation have been surprisingly good. It must not be forgotten that the method is a palliative one and that there are some drawbacks.

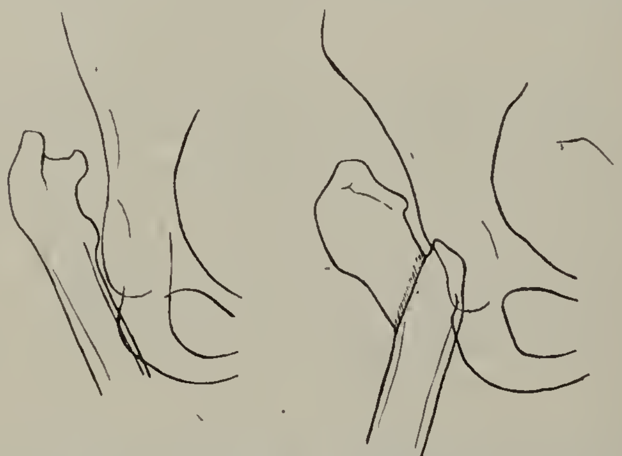

FIG. 4.—Shows at the left side the outlined x ray picture of a pathological osteomyelitic luxation. The upper end of the femur, the head being destroyed, looks like a broomstick. The sketch on the right side shows the bifurcation.

In the first place, the operation entails some shortening, which, however, can be equalized easily by the tilting of the pelvis at the side operated upon. In the end the high heel, which is necessary after the operation, as a rule is not higher—often lower—than before the operation. Stress must be laid on the fact that not the shortening but the elastic suspension of the body on the upper end of the femur is the sourse of the troubles of the patient.

To a certain extent mobility of the hip joint, especially flexion, is impaired, because the upper end of the shaft of the femur (the new head) acts as a brake when sliding on the anterior wall of the capsule. In spite of this limitation of movement, neither walking nor sitting is seriously interfered with. In many cases the flexion reaches nearly 90°. It seems that in the course of time flexion increases. This is due, probably, to the formation of a sort of sliding, smooth surface between the capsule and the new head. Also it is to be expected that by functional use the newly created head will lose its pointedness, becoming rounded by increase of its diameter.

It was an important question whether the pressure of the pointed new head on the capsule or on the periosteum would not cause pains. This may be so at the beginning, but my fears were dispersed by experience. Without being asked, many patients declared that while treading on the diseased leg they no longer felt the well known and disagreeable sliding up and down of the hip bone (trochanter major) but felt firmly supported by the thigh, and that without any pain.

Furthermore, it must be borne in mind that the operation does not aim at a cosmetic result—at least not in the first line. We do not operate upon the patient because he limps, but because we want to do away with his pains when walking, because we want to enable him to walk with endurance, while the cosmetic question is of secondary importance. I say so in spite of the fact that in many of my cases the cosmetic result has been excellent also. I think that at any rate the operation should be done in cases which are incurable, being beyond the means of any other therapeutic measure. This is the case with pathological (tuberculous or osteomyelitic) luxations of the hip joint and of coxa vara luxans. In these cases we have no other means of treatment but the operation. In cases of irreducible, refractory congenital luxations and in cases of pseudarthrosis colli femoris, bifurcation should be the last resource.

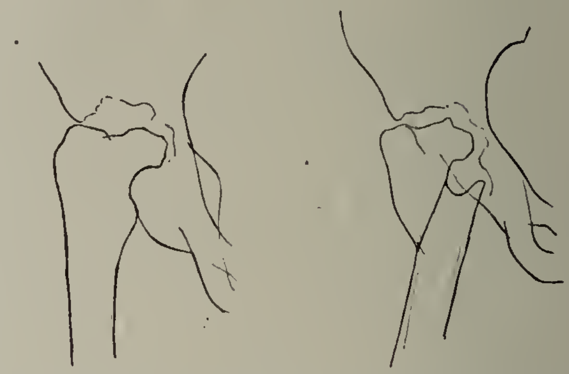

FIG. 5.—Left, shows a pathological subluxation of tuberculous origin. A minute head stands in an enlarged socket (function became painful after even light strains). On the left side, by the bifurcation, the pelvis is propped at the lower rim of the socket. Bifurcation of the upper end of the femur in cases of pseudarthrosis colli femoris offers a somewhat different picture.

Although in possession of bifurcation, I have not given up my bloodless methods, resorting frequently to what I have called "Inversion," especially in bilateral inveterate luxations with severe contractions, and in pseudarthrosis colli femoris complicated by strongly developed flexion adduction contraction of the functionally defective hip joint.

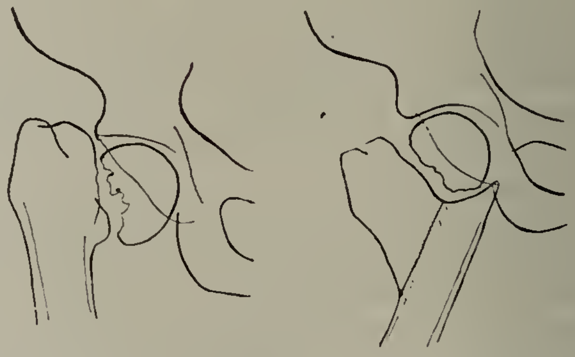

FIG. 6.—Shows, on the left side, a loose pseudarthrosis with marked dislocation upward of the great trochanter. The sketch on the right side shows the anatomical result of the bifurcation. In such cases the upper end of the lower fragment cannot be called a newly created head, because the normal head lies undisturbed in the socket; but it functions as a bony pillar propped against the lower rim of the socket, or, as it were, against the chin of the head. The pseudarthrosis is put out of commission. The head rests in the angle of the bifurcated femur.

It is an obvious fact that just in flexion adduction the hip joint is the least able to carry the weight of the body, because in this position of the thigh the iliac bone has to assume a more or less vertical direction, allowing the loosened upper end of the femur to slide up as soon as the weight of the trunk presses down the respective side of the pelvis, and to slide down when the diseased leg is in its swinging phase. Furthermore, the weakest posterior part of the capsule is put to strain with the thigh in this typical contraction.

By preliminary stretching and eventual severing of the adductor muscles, the adducted direction of the femur can be inverted in an extremely abducted (outward stretched) direction. By this forced abduction the iliac bone of the diseased side is lowered to a more horizontal direction, giving a kind of bony support to the top of the trochanter major. By inverting the typical flexion of the hip joint in hyperextension, the anterior ligaments of the capsule (Bertini ligament)—the strongest in the human body, equally are put to the commission of weight bearing. In this way the stretched soft parts at the posterior surface of the joint are relieved, and the source of pain is stopped.

I called this treatment of irreducible hip luxations and of old ununited fractures of the neck of the femur the method of inversion because the typical contraction, unfit for weight bearing, is inverted in the opposite contraction, in which the weight bearing, at least in part, is done by bony support and by the strong anterior ligaments of the hip joint. This treatment not only is without any danger and very simple, but it implies bed confinement of no more than a day or two. By adequate aftertreatment (plaster spica for some weeks followed by massage of the pelvitrochanteric muscles and active abduction exercises) the inverted position must be made habitual to the patient.

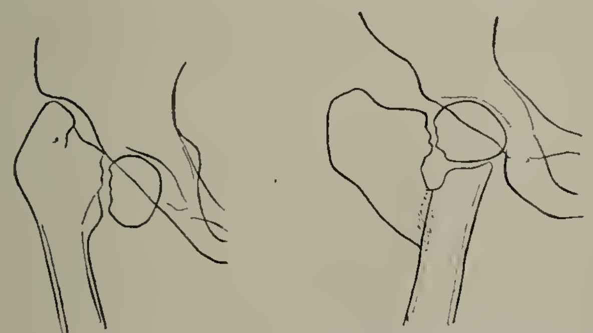

Fig. 7.—Seems to represent an analogous condition, but the left sketch belongs to what is called coxa vara luxans. After bifurcation the head is propped by the pillar of the shaft of the femur, as shown in the right side sketch.

Though the functional results of this bloodless treatment sometimes are surprising, it must be conceded that without proper aftertreatment inversion is likely to relapse. At any rate, inversion is the blandest means to improve, at least, the condition of aged patients suffering from pseudarthrosis colli femoris, and of adult patients with bilateral inveterate and irreducible luxations of the hip joints complicated by severe contractions. In the latter case it means not only correction or overcorrection of the contraction, but also may be considered as a pseudo reposition in so far as the posterior position of the head of the femur is changed into an anterior position, the posterior luxation being converted into an anterior one. Lordosis is corrected and the function of the hip joint is more or less improved. Should the result in the course of time become less satisfactory, bifurcation eventually may be added, because inversion does not prejudice bifurcation, but on the contrary might be considered as a preparatory or preliminary measure to the latter.

After the explanation of the idea and applicability of bifurcation in general, I have to describe the operation and its modifications in the special indications.

I begin with the cases which are characterized by an empty acetabulum (irreducible luxations of whatever origin—congenital, traumatic, tuberculous, osteomyelitic).

To create a large, wounded surface at the end of the fragments, the preliminary osteotomy has to be an oblique one. This oblique cut may be performed in a frontal or in a sagittal plane. In cases with an empty socket I have more recently followed a suggestion of my first assistant, Dr. Hass, to prefer the frontal plane. The plane of an oblique frontal osteotomy may be inclined forward or backward. The inclination forward recommended itself on account of the fact that this way the short superior fragment lies behind the lower fragment and is fixed by the latter: or we might say, the long lower fragment is at the same time an anterior fragment and is backed by the short superior and posterior fragment. Under these conditions the superior fragment should be prevented from slipping into a flexed position.

After the severing of the bone in a frontal anteriorly inclined plane, the upper end of the lower fragment is intentionally dislocated inward and somewhat upward to meet the anterior capsular wall of the joint. The socket being empty, there is room enough for the rounded ridge of the upper end of the lower fragment—it is large enough so that this rounded ridge, directed inward by abduction of the femur, can slide forward and backward on the anterior capsular wall, when flexion or extension is required. The chief advantage of the frontal anteriorly inclined section seems to be that abduction of the thigh does not necessarily imply a separation of the wounded surfaces, as abduction is carried out in a frontal plane.

On the whole, the question seems to be of no essential importance, as in many cases a sagittal section has given equally good results. Certain it is, however, that in x ray pictures the frontal cut makes a better tableau because the new head shows its rounded ridge not *en profil* but *en face*. Its crest is concealed, but it is not less sharp than in the sagittal cut.

The operation itself is quickly described when I omit all the aseptic and antiseptic preparations as a matter of course.

The patient is placed upon his sound side, the diseased thigh being slightly flexed so as to cover the site of the acetabulum. A longitudinal incision of about ten cm. is made through the skin and the muscles until the outer surface of the femur is laid bare. A broad chisel is then applied to the bone in an oblique line extending from the anterior aspect posteriorly and distally. The upper extremity of this cut should correspond with the upper level of the acetabulum. It must be a thorough osteotomy, and by no means an osteotomoclasy. When the bone is thoroughly cut and both fragments are isolated, the operator handles the lower fragment just in the same way that he is used to in the bloodless reduction work. After thorough abduction of the fragment, he pushes it inward and upward until he is sure of its new resting place in the empty acetabulum, that is, on the anterior capsular wall; the lower end of the upper fragment is pushed inward so as to form a nice angle at its junction with the inward, upward displaced upper end of the lower fragment. Intentionally I have abstained from any suturing of the fragments, their position being sufficiently assured by the abduction of the lower fragment. Tenotomy of the abductors is usually superfluous. Sutures of the fascia lata and the skin finish the operation.

While the plaster bandage from waist to toes is applied, the limb is held in abduction of about 35°, the assistant being advised to maintain the bony contact between the new head and the acetabulum by leaning against the limb. While applying the bandage, the operator takes care to tighten the rollers over the operative field, to maintain adduction of the upper fragment.

About a fortnight after the operation the patient is allowed out of bed and may begin standing and walking with crutches. After six weeks the bandage is cut and articulated at the knee joint to prevent rigidity. Serving the same purpose, the posterior part of the bandage over the calf of the leg may be removed to allow flexion exercises of the knee joint several times during the day. After two months the bandage is shortened to the size of a hip spica, leaving the knee free. Not before at least three months have elapsed may the spica be taken off definitely.

Aftertreatment consists of massage and gymnastics of the pelvitrochanteric muscles.

In cases in which the socket contains the head of the femur (pseudarthrosis colli femoris, coxa vara luxans) the preliminary subtrochanteric osteotomy is performed in a sagittal plane which is inclined toward the median line. At the operation the patient lies on his back. The skin incision is made at the anterior exterior aspect of the thigh, below the great trochanter. The bone cut is made in a sagittal inwardly inclined plane, beginning at the internal aspect of the femur at a level with the centre of the socket, and extending laterally and distally.

In dislocating inward the upper end of the lower fragment, it must be borne in mind that the socket is filled by the head, and that the crest of the lower fragment must find its mooring place somewhere at the lower or lower inner border of the acetabulum, eventually at the lower part of the head—as it were, at the chin of the head. A frontal cut would not do in these cases, as there is not enough room for the crest of the lower fragment, extending in a frontal direction.

The x ray pictures in these cases show the crest of the lower fragment in profile as the pointed end of the short prong of the fork. In this sort of case the cutting of the bone is done at a higher level than in the cases of irreducible luxation with the head standing high up. The upper, inner end of the cut should begin just below the trochanter minor, so that the osteotomy should still be of the subtrochanteric type.

This is, by the way, a question that often has been discussed at the operating table. In a subtrochanteric osteotomy, the upper fragment is under command of the ileopsoas muscle, and flexion might be the result; so much the more if the plane of the bone cut is a sagittal one. But so far we have not seen such an incident, or rather, an accident, which might endanger the bony union of the fragments.

Oblique intertrochanteric osteotomy just above the trochanter minor is scarcely advisable in cases of loose pseudarthrosis, which allows dislocation upward of the stump of the neck to a higher degree. Beside, there is always the danger of opening the joint with the chisel, which should be avoided at any rate. There is a possibility that the chisel might divide the trochanter minor into two halves, and that the handling of the lower fragment would become difficult on account of the insertion of the ileopsoas muscle. We have not met with this incident, which can be avoided by a high subtrochanteric osteotomy just below the trochanter minor.

In cases with filled, as well as with empty sockets, I have often made the mistake of gauging the upper end of the cut too low, but so far have not seen any bad consequences.

The cardinal question in my therapeutic endeavors was whether or not the intentionally dislocated fragments would undergo a firm bony union. The fact must be considered that usually the contact between the wounded surfaces is very small, and that in many instances the wounded surface of the upper fragment does not at all come in contact with the wounded surface of the lower fragment, but just touches the intact periosteal surface of the latter. The whole value of the operation is entirely dependent upon this question.

I dare say it cost me many a sleepless night, when I found out, in a certain case, that six weeks after the operation the union seemed to be quite questionable. There were moments when I had made up my mind to give up my endeavors as a failure. At this stage of my studies a special case in a quarrelsome, discontented woman of about fifty years, who complained all the time of her pains and her weakness (she had had pneumonia some weeks after the operation) threatened to drive me mad. As she insistently declared that she could not put her foot on the floor to make one step, I ordered a very expensive walking machine to get the woman out of sight at last. By the by, I did not like to see this woman, who seemed the embodiment of my troubled conscience. I stopped all operations, and suffered severely from my disappointment. About four months later the woman in question made her reappearance. She had discarded her machine and walked like a marvel. In order to have a souvenir of her which should teach me never to despair too soon, I brought that "hated" woman with me to America—in the shape of her moving picture.*

In the bifurcation operation, we can rely on the fact that subtrochanteric fractures, even if dislocated, have a great tendency to heal by firm bony union. Just as the fracture of the neck of the femur, by its incapacity to produce a bony callus, gives source to the trouble, so the subtrochanteric fracture lends itself to the relief of the same.

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*While the material of this article has never before been published in America, the moving pictures referred to herein were shown, with comments, before the Society of Medical Jurisprudence of New York City on December 12, 1921, and more recently before the Eastern Homeopathic Medical Association at Trenton, New Jersey, on October 27, 1922.

In closing I have to repeat that bifurcation is not a radical but a palliative method. The luxation, the pseudarthrosis, remains as it was, but it has become excluded from its function of weight bearing and deprived of its bad sequelæ. One might say, it has been cheated out of being a source of suffering to the patient. Practically speaking, it means a cure, because the symptoms of the real as well as of the pseudoluxation are done away with. The characteristic limp disappears because there is no more sliding of the upper end of the femur on the outer surface of the iliac bone. Endurance in walking is very much improved, sometimes even reestablished, because the pelvis has direct bony support. The Trendelenburg-Lorenz symptom disappears. Some patients have become able to jump on their diseased limbs. Some of them walk with a scarcely perceptible limp, can jump, run and climb mountains. On different occasions I have demonstrated such patients at meetings of the surgeons in Vienna. The extent of the restoration of function and the cosmetic results exhibited elicited much general surprise and favorable comment, as they did when I exhibited their moving pictures over here in America.

We operated upon about sixty patients, a minute analysis of which will be given by one of my pupils at a later time. There still are some questions to be solved.

My bifurcation method cannot and will not compete with other reconstruction measures as far as the anatomical reconstruction of the hip joint is concerned. It will compete with them only in two respects: first, in the functional results—as far as these are concerned everyone may judge from the moving pictures; second, in the degree of danger involved in the operation—as far as danger is concerned, I may say that it is equal to zero. To avoid any shade of danger I am accustomed to perform the operation subcutaneously with the same good results.

It is beyond my understanding how such extremely dangerous operations as resections of the joint, including reconstruction of same by extirpation of the head of the femur and the creation of a longer neck by way of resection and dislocation downward of the great trochanter, etc., could be conceived and proposed to elderly patients, who evidently risk their life by the operation without being in danger of life by their ailment. In my opinion such operations can be considered only as a sign of desperation on the part of the surgeon in his hopeless struggle against an insoluble problem. In bifurcation even a failure will do no harm to the patient, not to speak of endangering life.

I must add a word on the really radical operation of bone grafting by the insertion of a tibia nail into the neck of the femur. This operation is much less dangerous than the resection methods, provided that the pseudarthrotic tissue between the fragments of the neck of the femur is left alone and the joint be not opened. Although it takes a very long time—not less than at least one year—before the nailed fracture can be trusted to bear the weight of the body, the final results may be beautiful, as I have seen in some of my own cases. But the grafting method can be applied only in fresh cases in relatively young and strong patients. In old cases of loose pseudarthroses, the chances of the grafting operation are, so to say, zero. The bifurcation operation has to deal only and exclusively with these loose, old cases of pseudarthrosis which baffle all therapeutic measures; therefore bifurcation does not compete with the grafting operation in fresh cases, but surely is superior to the latter in the old pseudarthrotic cases.

CONCLUSIONS.

Though etiologically different, irreducible congenital or acquired hip luxations and similar conditions, as ununited fractures of the neck of the femur, coxa vara luxans, etc., anatomically have in common the loosened connection between the pelvis and the upper end of the femur. Pelvis and trunk no more are directly supported by the bony pillar of the femur, being suspended only by the soft parts (muscles and capsule) upon the upper end of the femur.

Similar anatomical conditions account for similar functional symptoms, as flexion adduction contraction, dropping of the pelvis toward the sound side, limping, lack of endurance or inability to walk because of more or less severe pains due to the stretching of the soft parts by the weight of the body.

It makes no difference that in pseudarthrosis colli femoris the head is left in the socket, because the pseudarthrotic tissue between the fragments is put to stretch by weight bearing in the same way as the rest of the soft parts.

The similarity of functional disturbance in cases of irreducible luxations and pseudarthrosis colli femoris, etc., suggests similar, or rather, identical therapeutic procedures.

The problem to be solved is to change the elastic suspension of the body on the upper end of the femur, to a direct bony support of the pelvis by the femur.

As it is impossible to use the irreducible or deficient head (as in cases of pathological luxations) as a means to directly support the pelvis at the socket, a new artificial substitute for the head must be created.

This is done by an oblique cut of the femur at the level of the socket. The upper end of the lower fragment (the substitute for the head) by adequate maneuvres is reduced into the capsule covered socket, while the lower end of the upper fragment is brought into contact with the lower fragment, with which it will be united by bony tissue. In this way the upper end of the femur has become transformed into a fork with two unequal teeth, or prongs: therefore the procedure is called bifurcation of the upper end of the femur.

The characteristic feature of this operation is reduction into the socket of a newly created substitute for the irreducible head. Subtrochanteric osteotomy, then, is only a preparatory step to bifurcation. As reduction into the socket of a substitute to the head, bifurcation is clearly differentiated from all other subtrochanteric osteotomies in which the correction of the contraction is the only aim.

Therefore, bifurcation is a completely new operation of quite a distinct character, and this character is reduction by way of forcing the femur to make a side way to reach the socket instead of passing by.

In cases of pseudarthrosis colli femoris, the upper end of the lower fragment is displaced and propped against the lower rim of the socket, or, as it were, against the chin of the head which is contained in the socket. In this way the pseudarthrosis is put out of commission, the pelvis being sustained directly by the bony pillar of the femur.

Drawbacks to the operation are: some shortening (equalized by tilting of the pelvis), and some restriction of motion. Advantages are: the lack of danger, the relatively short time of treatment, as common in fractures of the femur, and the good functional results, which have been demonstrated in Vienna and in the moving pictures which have been shown in America.

Nevertheless, I consider the operation as the last resource, especially in cases of pseudarthrosis of the neck of the femur, while in cases of pathological luxations bifurcation is the only therapeutic measure available and should be resorted to always.

Although in possession of bifurcation, I have not given up my bloodless method of treatment in cases of irreducible, especially bilateral, luxation and in cases of old ununited fractures of the neck of the femur, especially if complicated by severe contractions of the hip joint. I call this bloodless treatment inversion because it aims at inverting the concomitant contractions. By overcorrection of flexion, the strong anterior ligaments fit for weight bearing are put to strain, while by overcorrection of adduction the iliac bone is lowered so as to come in contact with the trochanter major offering it a kind of bony support.

Though the functional results of inversion sometimes are surprising, it has to be conceded that without proper aftertreatment relapses may occur. Inversion does not prejudice a later bifurcation.

Bifurcation is not a radical but a palliative treatment. It does not compete with radical methods (resections—reconstructions—grafting methods) as far as anatomical restitution of the hip joint is concerned, but it competes with them in two respects: first, in the functional results which have been demonstrated as excellent; second, in the lack of danger. While danger in bifurcation is, so to say, equal to zero, patients subject to resection methods risk their lives without being in danger of life from their ailment.

The applicability of the bifurcation operation is manifold:

1. In cases of irreducible congenital hip dislocation.
2. Eventually in cases of refractory congenital luxations.
3. In irreducible traumatic hip luxations.
4. In pathological dislocations due to osteomyelitis or tuberculosis.
5. In the severest cases of coxa vara (coxa vara luxans).
6. In cases of pseudarthrosis colli femoris.
7. In cured cases of tuberculous hip disease complicated with frequent attacks of severe pain.
8. Eventually in cases of severe arthritis deformans coxæ in older patients, to control pain by relieving pressure in the joint.

The Lorenz Bifurcation Operation

A Preliminary Report

By DEXTER D. ASHLEY, M.D.,

New York.

Time and again patients have come to me with long standing deformities of the ileofemoral articulation—unstable, painful—due to disease, fracture, or congenital malformation. For these patients, in the past, I have been unable to suggest any satisfactory method of surgical relief without endangering life.

For such conditions this simple operation, almost bloodless and devoid of shock, reduces the danger to the vanishing point. In this respect the operation is on a par with the subcutaneous osteotomy of Gant for the correction of the bony or fibrous ankylosis of the hip in deformity, and the stable hip in adduction deformity, with its consequent shortening.

Various operations have been devised by our best orthopedic and general surgeons to stabilize these painful hips, among which should be mentioned Whitman's reconstruction operation, drastic operations by the late J. B. Murphy, and the bone graft, or peg, of Albee; operations fraught with great danger, and requiring a very precise and careful technic, their application being limited to those patients whose constitutional resistance would make them fair subjects for a major operation. This would exclude from operation the majority of patients so afflicted. The bifurcation affords a procedure that is admirable in its wide adaptability, giving as a result a surprisingly stable, movable hip.

Let us take, for example, a case of broomstick deformity of the femur: that is, loss of the head and neck due to disease or old fracture, which has left the limb in marked adduction and flexion, the line of weight bearing in such a flexed and adducted femur being directed outside the pelvis, the diseased or broken remnant finding no stability in the soft tissues on the sloping side of the pelvis. Until a year ago I did not feel capable of giving any relief in such a deformity.

TECHNIC OF THE OPERATION.

The patient, having been anesthetized, reclines on his unaffected side, bolstered up with sand bags, the well limb being flexed at thigh and knee, the limb to be operated upon being held by an assistant resting on a sand bag. The assistant is directed to hold steady, rotate inward or outward, or maintain the limb in a position of adduction-flexion, thus laying the shaft of the femur across the site of the acetabulum.

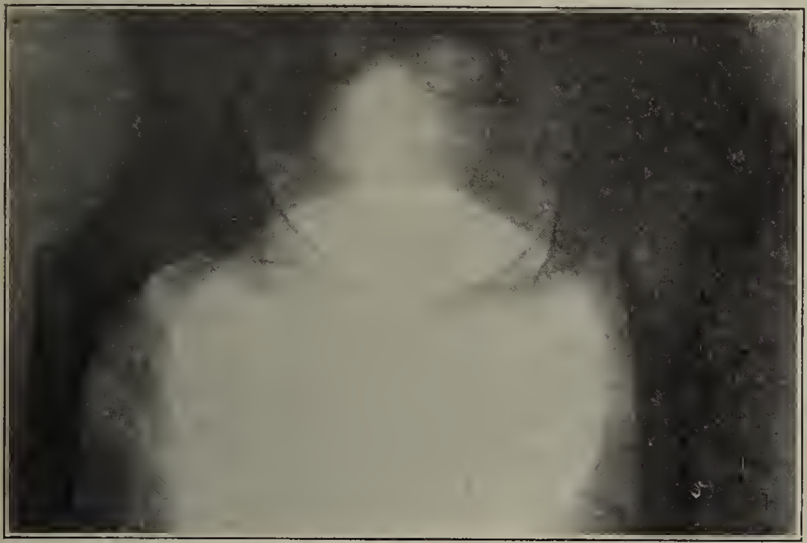

Fig. 1.—Case III.

The field having been prepared with the ordinary iodine application for surgical procedure, the surgeon measures from the top of the great trochanter to a point about opposite the centre of the acetabulum, this point having been plotted out on an x ray picture. Toward this point the chisel is to be directed.

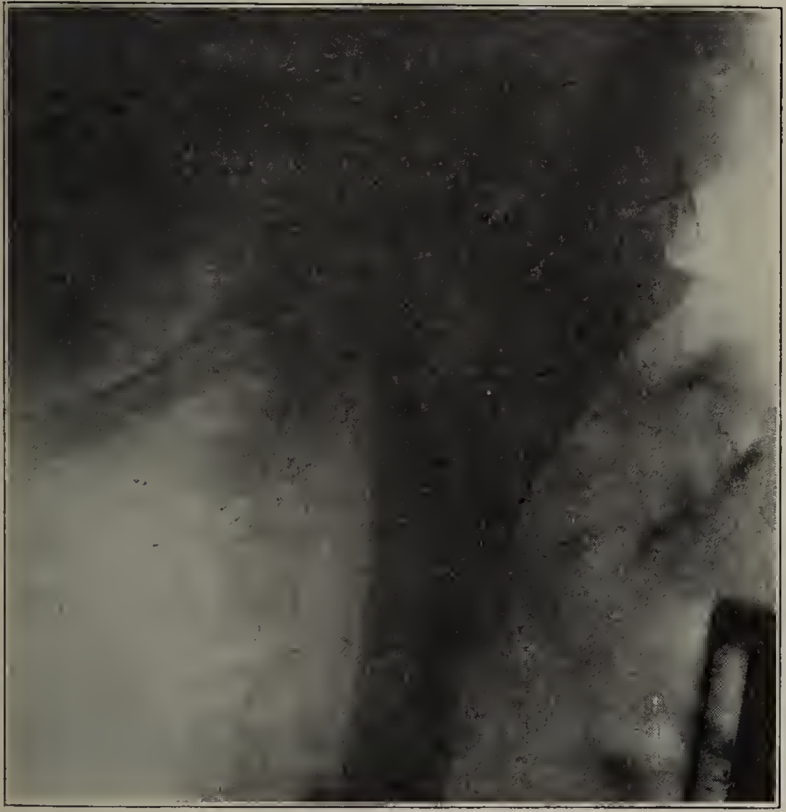

Fig. 2.—Case III.

A chisel of suitable width according to the size of the bone is inserted at a point below the acetabulum; a complete fracture of the bone is made, cutting obliquely inward and upward, or from behind upward and forward, executing an oblique osteotomy (Fig. 1). The distal fragment is thoroughly separated from the proximal fragment by the chisel, which is then withdrawn and the small opening sewed up with two or three stitches and covered with aseptic gauze retained by adhesive plaster. In subjects who are excessively fleshy a small incision is made down to the bone.

The bayonet end of the long bone is then dislocated or insinuated into the acetabulum (sometimes against its lower rim) finding a stable position. The limb is abducted until the line of weight bearing falls well within the pelvis. Any existing deformity is over corrected.

The assistant carefully maintains this position of the distal fragment by pushing gently upward, keeping it in touch with the pelvis and the knee straight. The proximal fragment is pushed inward and downward until its distal extremity comes in contact with the outer surface of the distal fragment. or the shaft of the femur. After union we have a forked shaped upper extremity of the bone, the outer arm of the fork formed by remains of the upper part of the femur, and the inner arm of the fork formed by the bayonet like point of the distal fragment, making thus the socalled "bifurcation."

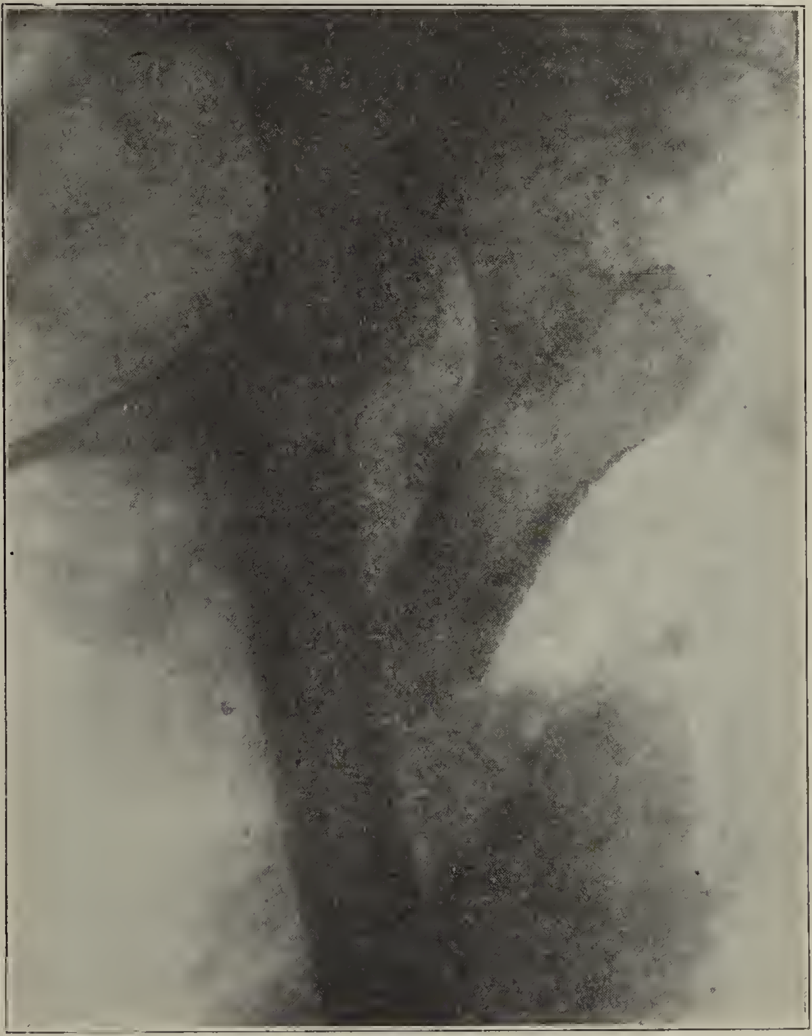

Fig. 3.—Case V.

A plaster of Paris spica is applied including the foot, care being taken to hold the proximal fragment in position by careful moulding of the plaster.

This oblique osteotomy is a matter of a very few moments; the dislocation and finding the stable position a matter of even less time; the whole operation, including the application of the spica, requiring only from twenty to forty minutes. The operation is almost bloodless with no perceptible shock to the patient.

The patient is usually sent home in plaster in from five to ten days. In two or three weeks he is directed to walk around on crutches. In from six to eight weeks the plaster is removed below the knee, permitting knee flexion and extension. In from twelve to fourteen weeks the plaster is all removed. It is desirable in all cases to follow progress by x ray.

When the plaster is removed the amount of movement of the hip may be small, but this movement will be found to increase gradually. After six months it is remarkable what feats of walking these patients will perform on a limb which was formerly comparatively useless, insecure, and painful.

The real distinction of this operation lies in the establishment of the upper extremity of the distal fragment of the shaft of the femur against the pelvis, near or within the acetabulum.

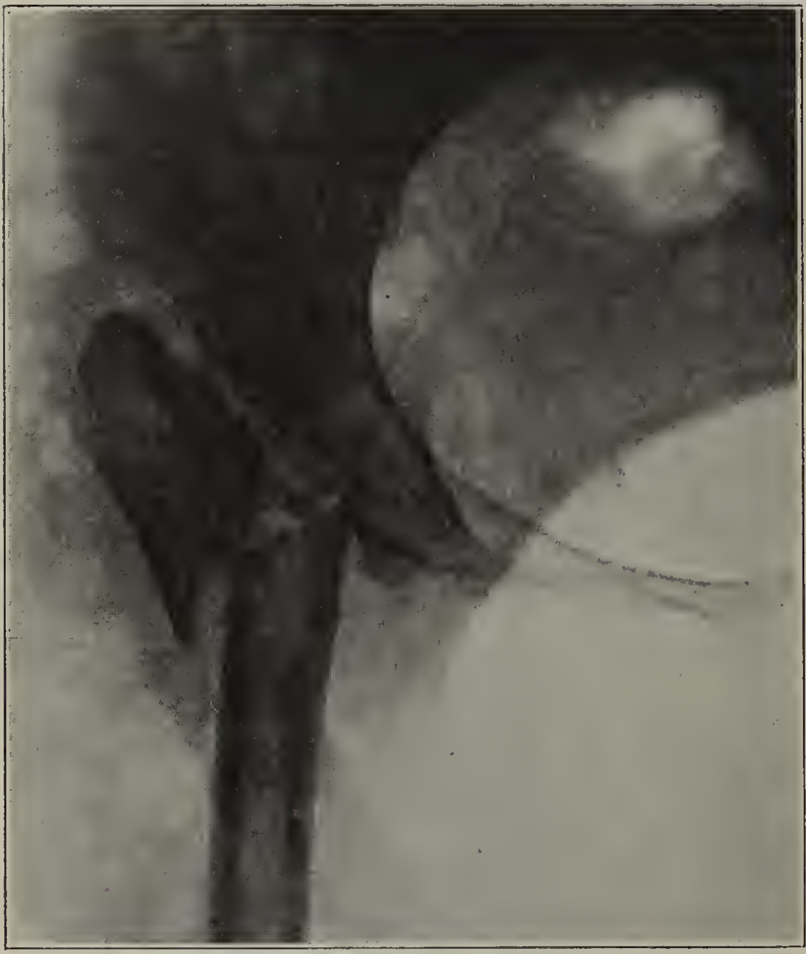
FIG. 4.—Case IX.

Upon first seeing an x ray of a bifurcation, one is astonished to note the bayonet point of the inner fork, and wonders why it is not a constant source of irritation. A fascia (or fat flap of Murphy) has been caught upon this inner prong of the fork, covering the end, which in healing becomes rounded, making a weight bearing point against the pelvis.

It is not asserted that the technic of this operation has been fully developed. Some operators may wish to do more open work, well exposing the bone in order to see the point of osteotomy to better advantage. A Gigley saw could then accomplish most accurate technic. As remarked before, this open work is desirable in fleshy subjects. There is a possibility that the bone may be cut higher or lower than is desired; if too low, or not sufficiently oblique, more shortening is produced; if too high, it is difficult to place the upper end of the distal fragment in or under the acetabulum, which is the real aim of the whole operation. In cases in which the acetabulum is partially filled by a diseased femoral head, or with the remains of the head after fracture, the proximal end of the distal fragment is placed just at the edge of the acetabulum, under the diseased or broken off head. So far in the history of the operation, the proximal fragment has always united firmly with the distal fragment, producing a true bifurcation.

The broad application of this operation can hardly be appreciated at first glance. Foremost of the conditions to be benefited is the old, ununited fracture of the neck of the femur. If this operation were applicable to this condition alone, it would be a remarkable addition to our surgical procedure. In the second place this operation is indicated in pathological, unstable conditions due to tuberculosis, acute infections, acute arthritis neonatorum. Third, it is available also in cases of old, painful congenital dislocations, or pathological dislocations after typhoid fever, osteomyelitis, and other similar conditions.

None of the conditions above summarized can be relieved by a Gant's osteotomy. The bifurcation operation gives a stable, movable hip. The amount of flexion permitted will largely depend upon the mobility of the proximal fragment upon the pelvis. It does not always overcome the entire shortening of the limb; in fact, it may be seen that it would make the limb actually shorter, but this partially, if not quite, compensated by the abducted position of the limb. The line of weight bearing is changed to direct support under the pelvic basin. The importance of this must be conceded. The stable, shortened limb can be compensated by an elevation in the shoe.

The history of these old, tuberculous hips is the record of many stretchings, forcible corrections of adduction and flexion deformities, with as many relapses into deformity. Many give a history of a Gant osteotomy, with relapse, especially in young and adolescent sufferers. This operation removes the weight bearing to a nondiseased area, providing a double weightbearing surface. We might say that the inner prong of the bifurcation is a peroneal crutch, relieving the weight bearing from the outer prong.

After this operation the limb is prevented from going into adduction deformity by its brace of the outer prong of the fork, or the position of the proximal fragment.

This operation is not recommended when the lowering of the pelvis to one side, which occurs after operation, would tend to make unstable the articulation on the other side, as would happen in double hip disease; or in the case where one hip is dislocated and the other partially luxated.

Dr. Lorenz has had films taken in Austria showing many of these cases walking, climbing mountains, and bearing burdens with great freedom and ease within six months after the operation. These films were shown recently at Trenton, N. J., by invitation, and some of the early films were shown at the Academy of Medicine, by invitation of the Society of Medical Jurisprudence, in December, 1921.

346 LEXINGTON AVENUE.

The Correction of Congenital Club Foot

By E. H. BRADFORD, M.D.,
Boston, Mass.

After correction of the club foot deformity it is important that in walking the sole of the foot should be placed normally on the floor at every step and not strike so that the chief weight bearing comes upon the fifth metatarsal. This may occur in small feet even though the displaced bones may have been placed in their normal relations. This will occur even in larger feet if complete correction has not been made of the misplaced bones especially in placing the cuboid in its normal relation to the os calcis. Where this is observed in a corrected foot it is due to the fact that the peronei have not gained the normal strength in balancing the opposing tibial muscles or that the ligaments are not normal in their tension or elasticity. A continuation of a confining bandage is manifestly contraindicated under these conditions. A shoe with a thick wedge on the sole under the cuboid and in some instances a light efficient ankle brace worn for a few months will enable the patient to gain through the normal exercise of the foot and ankle muscles a normal condition.

I am able to present testimony as to the permanency of the cure of talipes equinovarus. Several congenital cases of double equinovarus operated upon by me and one case treated in infancy by corrective bandaging without tenotomy were examined by me several years after treatment, in two instances twenty and thirty years after the cure. The condition showed an absolutely normal condition of the feet except that in some of the single cases the foot was slightly smaller than the other foot.

Before the anatomy of congenital club foot was accurately known cruder methods of treatment were often tried and advocated. It is evident, however, that the less the mutilation following the corrective methods used the better is the method, provided it is equally corrective. Furthermore, the more accurately the method employed fits the pathological anatomical condition the less mutilating will be the result.

When it was thought that the deformity resulted from a shortened condition of certain muscles cure was expected to follow tenotomy with a slight amount of correcting pressure. When poor results followed it was inferred that a deformity in the bones existed which necessitated excision of certain bones or tarsectomy to overcome misshapened individual bones not corrigible by pressure and tenotomy. After it was learned that the defect was due to a prenatal arrest not in the shape of the tarsal bones, but a congenital malposition of the midtarsal bones with resulting adaptive changes of the soft tissues connecting the tarsal bones it became evident that the bones could be saved from resection provided that they could be placed in their normal anatomical relations to the other tissues. To effect this it is only necessary to stretch or lengthen the abnormally shortened tissues which hold the distortion. It is also evident that if these resistant tissues are not all overcome relapses or imperfect results are to be expected. As the strength of the resisting tissues varies the suitable correcting measures vary in different cases. It is true that in many severe cases alterations in the bones have taken place but these are much less extensive than was at one time supposed and involving few of the tarsal bones do not prevent satisfactory correction and in young patients need not be considered as of prime importance as they are corrected in the later growth of the corrected foot.

Where but little change in the shape of the bones of the tarsus is present the correction of club foot may be regarded as the reduction of a congenital dislocation at the midtarsal joints, i. e., the astragaloscaphoid and the calcaneocuboid articulations. To prevent a relapse it is necessary that correction should be complete at both of these articulations. It is not sufficient to bring the foot to an apparently normal position simply placing the scaphoid in front instead of to the inside of the front end of the astragalus; it is also essential that the cuboid be placed in the normal relation to the front of the os calcis and in relatively the same plane and not on a lower level and to the inner side of the anteroposterior axis of the former bone. The obstacles to this reduction of the malposition in the tarsus is chiefly in the strong ligamentous tissues which hold the misplaced bones in their faulty position. If these are divided or torn and the shortened Achilles tendon lengthened by stretching or better in most cases by subcutaneous tenotomy the slight misplacements of the other bones of the foot can be easily overcome. The inward pointing of the end or the heel, the faulty inclination or the line of the metatarsal heads, which instead of being flat on the plane of the standing base is inclined upwards on the inner side, are all readily corrected after the chief characteristic of the club foot deformity, viz., the midankle dislocation has been removed.

In the exceptional cases where some distortion in the shape of the astragalus and cuboid exist experience has shown that very mutilating operative procedures are not needed even in adult feet.

In many cases after the most resistant ligaments have been divided and the Achilles tendon has been tenotomized the rest of the correction can be completed by manual force. This is almost always true in young children especially those who have not been operated on before and have relapsed. In the simpler cases and in younger patients complete correction can be effected by stretching with repeated plaster bandages usually with, but sometimes without, tenotomy of the Achilles tendon. In some relapsed and more resistant cases, however, more than manual correction is needed even after thorough division of resistant tissues.

It is unnecessary in this paper to refer to the various operative procedures in which sections of bone are removed. These have been employed by me in many instances in my earlier experience and have proved serviceable in giving good functional results. But they are all to a greater or less degree mutilating. Of these the least objectionable on this ground is ostectomy at the anterior end of the os calcis. Later experience has proved that even this minimum of bone removal is unnecessary if adequate correction by properly applied force is accomplished.

An admirable force applying implement in the correction of club foot is the well known Thomas wrench. This instrument, which consisted originally of an adapted monkey wrench, though efficient in skillful hands in twisting the front of the foot, is not mechanically a well adapted tool to force the anterior end of the os calcis to the inner side while the front of the foot is twisted out. A better implement is also needed to press the cuboid up while the astragalus and os calcis are held down.

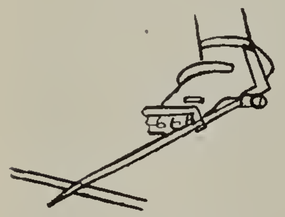
Fig. 1.—Club foot twister applied.

An implement of unlimited force as a club foot twister was devised some forty years ago to meet the surgical indications in the case of a woman thirty years of age with a severe congenital club foot. No attempts had ever been made to correct the deformity but as the woman had grown heavier she asked to have the foot amputated. The deformity was of the extreme resistant type, the patient walking on the side of the top of the dorsum of the foot. It was thought that if the desired amount of force was accurately applied sufficient to tear all obstructing ligaments and correct the deformity by placing the front part of the foot in front and not to the inner side of the midtarsal articulation at the same time twisting the front of the foot so that the cuboid and head of the first metatarsal should be placed on the normal weight bearing plane a cure could be accomplished. The risk encountered was that the foot would be so torn as to require subsequent amputation. It was, however, thought that there was enough elasticity in the main artery on the concavity of the distorted foot to stand the needed stretching and that the skin as is shown in osteoclasis could endure any amount of temporary pressure without sloughing. A long steel bar was placed at the inner side of the foot with a steel attachment so arranged as to hold the front of the foot in a firm clamp while the outer side of the astragalus and the outer and anterior part of the os calcis was held in a steel hook (worked on the long bar by means of a screw nut) pressing the midtarsus inward and downward while the requisite force pressed the front of the foot outward and upward. The handle end of the lever bar was furnished with a crosspiece so that the needed amount or twist could be given the front of the foot. The expected happened, a great amount of force was under the surgeon's hand and the deformed foot was warped into a normal shape. A tenotomy of the Achilles tendon was the only incision needed and that was done subcutaneously. A large tear of the skin and deeper soft tissues followed the correction but the tibial arteries were not injured nor were the nerves injured.

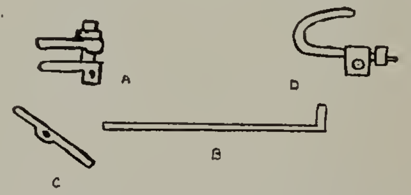

Fig. 2.—Club foot twister parts: a, toe clip; b, rod; c, handle; d, hook.

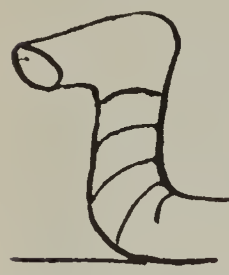
Fig. 3.—Position of limb while plaster of Paris bandage is hardening after correcting operation for club foot.

As the torn tissue could be thoroughly cleansed and afforded perfect drainage healing took place under an aseptic dressing without suppuration, the inch wide gap filling in with new formed tissue under the blood clot. The foot was put up in an overcorrected position of slight valgus and held in a plaster bandage, the foot being well padded with sheet wadding. The plaster bandage was applied to the whole leg and above the knee to prevent inversion of the foot through any rotation of the leg inside of the plaster. The retention bandage was applied while the patient was under an anesthetic, a window being cut to allow a change of dressing at the place of torn tissue. But few dressings were needed and no change in the plaster bandage. Crutch locomotion was permitted early. All bandages were removed at the end of six weeks. Three months after the operation the patient reported that she went to a dance but did not herself dance. The cure was recorded by casts before and after the operation and are placed in the Warren Museum of the Harvard Medical School. The patient was heard from a year later as in a condition of normal locomotion with no tendency of a recurrent deformity.

There have been a number of excellent club foot wrenches in use but in my experience the one here mentioned is the most efficacious in the larger and most resistant cases of sufficient size as to be too large for manual force. Its superiority lies in its greater precision in the application of the needed force in definitely correcting the most important bone displacements.

The resistant character of the smaller of the ligaments holding the scaphoid and os calcis in distorted positions often makes complete correction difficult. The surgeon is sometimes led to believe that if the foot has been forced into a normal shape it will remain so, forgetting that the elasticity of the stretched tissues may enable the bones to spring back to the distorted alignment. The most resistant of the distorting ligamentous tissues are those connected to the internal malleolus above, are continued down into the hollow of the foot and hold the scaphoid and cuboid in their faulty alignment. In the ordinary cases these tissues can be sufficiently stretched or can be freely divided by proper skilled subcutaneous tenotomy, avoiding injury to the nerves or important bloodvessels by keeping close to the bones and cutting inwards. In the more resistant cases the surgeon desires to assure himself that complete division had been made without injury to the artery and prefers to make an open incision. There is a great disadvantage in this from the large skin gap which is left in the correction of the foot deformity and which is not covered by suturing the cut skin edges together as the gaping opening is too wide and the skin elasticity is not sufficiently great in the neighboring region for satisfactory flap covering.

This difficulty of a large gap of uncovered wound tissue healing slowly under a blood clot can be avoided by the following procedure, which is not necessary in such cases as can be corrected by the use of manual or instrumental force.

Any surgeon trained in the use of the osteotome is able to make it a safe and serviceable, subcutaneous, surgical, blunt, dissecting instrument. A thin and somewhat narrow instrument should be used and the corners rounded off. Such an osteotome can be driven through the skin safely (without the previous use of a skin incision) at the lowest part of the internal malleolus. No vessels can be encountered if the instrument is driven down to the bone at its middle and not at the edge. The osteotome, after it is through the skin, can be pressed down in the loose subcutaneous tissue and used as a blunt dissector to free the attachment of the internal lateral ligament at the end of the internal malleolus and also all the attachments at the inner and under side of the hollow of the foot. As all the vessels are free of the bone they are uninjured by the osteotome if it is kept close to the periosteum. It is advisable to insert the osteotome freely between the scaphoid and the astragalus all along the edge of its apposition. It may also be advisable to insert the osteotome on the outer side of the foot to free, subcutaneously, the cuboid from any faulty attachments at the anterior end of the os calcis.

After these shortened tissues have been freely loosened from their terminal attachments subsequent stretching should suffice to enable the surgeon to overcorrect the deformity and secure it in a stiff bandage with the use of but little correcting pressure. Tenotomy of the Achilles tendon should not be done until all varus correction has been accomplished.

If the surgeon has succeeded in thoroughly correcting the deformity, the foot well protected with thick sheets of wadding can be immediately placed in a plaster fixation bandage and the operation is completed. If the correction is only made with the employment of considerable force, and there is a great tendency to a recurrence to the position of deformity, it is safer to defer complete correction or overcorrection until a second correcting plaster bandage can be applied; but as this requires an additional anesthetization, correction should be done at one sitting if possible, and this is usually possible. Abrasions and tears of the skin, if they are covered with aseptic cotton and the skin cleansed, give no trouble. It is important to protect the head of the first metatarsals as well as the phalanges by thick layers of cotton wadding to prevent pressure sloughs. The danger of these can be avoided by inspection which can be made by removing the upper part of the plaster bandage which has been cut as a bivalve so that the foot can be seen without displacing the corrected foot. The presence of pain after the day following the operation should be regarded as indicative of a threat of pressure slough.

It is well to remember that the two most important corrections to prevent relapses in resistant club foot are pressing of the cuboid, the varus and equinus, not only well from its abnormal position in relation with the end of the os calcis and well up from the weight bearing plane of the sole of the foot but also it is essential that the equinus position should be satisfactorily overcome.

It is often difficult in operating upon resistant cases after satisfactory correction to fix the foot in an apposition, adequately correcting the equinus deformity. This results from the difficulty in holding the heel down while the front of the foot is pressed up as the plaster bandage is applied and hardening.

A simple maneuvre will be found to aid in this. After the plaster is applied to the well padded foot the patient should be placed on his face and the leg held with the knee flexed at a right angle and pressed down upon the operating table. By pressing upon the sole of the foot operated upon, adequate correction both of the varus and equinus position is easily possible while the rest of the plaster bandage is applied and hardening.

It may be said in conclusion in regard to the subject of club foot and its correction that the surgeon can not escape responsibility for the result of his method of treatment. The deformity is eminently curable and in case of failure the methods employed have either not been properly carried out by the patient's attendants, or were not perfected by the surgeon in charge. Club foot is always amenable to the surgeon's skill if he is given a full opportunity to employ it.

When it is realized what a distressing deformity club foot presents its surgical correction and definite cure constitute an important advance in surgery. Future Lord Byrons, Talleyrands (to say nothing of Tamerlanes) will be able to follow the careers of their choice and to live without the sense of a curse of Heaven. The achievement in surgery has not been easily accomplished. From Stromeyer, Delpech, and Little to modern methods many years of effort and study have been needed. Recent progress has been gratifyingly rapid and today the successful procedures are easily learned by trained and painstaking surgeons.

The writer wishes to take the opportunity to acknowledge valuable suggestions in an interesting paper (1) by Dr. F. R. Ober, of Boston.

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1. Ober, F. R.: *Journal of Orthopedic Surgery.* Vol. II, No. 10, 1920.

133 Newbury Street.

Dislocation of Foot.—T. Turner Thomas (*Surgery, Gynecology, and Obstetrics,* July, 1922) says that posterior dislocation of the ankle with fracture of the posterior tibial margin and Pott's fracture has received little attention in this country. The dislocation has been generally attributed to relaxation of the ankle joint resulting from the Pott's fracture. The prognosis will depend largely upon the degree to which the reduction of the displacements has been accomplished and maintained during the development of bony union. Without reduction the impairment of function must be serious. With reduction, the function has been essentially normal in all of my reduced cases except in two recent ones which have not yet had sufficient time to recover normal function. The reduction should always be proved by the x ray, and it should be maintained by a plaster cast because no other method will maintain the reduction satisfactorily. Moreover, for the same reason, the cast should not be removed until bony union is assured.

Foot Strain in Golf

By NORMAN D. MATTISON, M.D.,
New York.

There is probably no counsel given by the physician to his patient in need of the out of doors, which is carried out with so many variations as is the advice to "take up golf." Nor does the playing of the game, theoretically perfect for aiding in restoring physical and nervous balance, always result in the most salutary benefit. It is of interest, therefore, to consider some of the reasons for the frequent mental anguish and nervous unrest during a round of the links, the completion of which should find the player refreshed and renewed, instead of physically and nervously tired, as is so often the case.

Many of the difficulties attending the playing of golf have to do with a lack of coordination on the part of the player. And in a game which requires such exact control and distribution of the body forces, it is important for the player to know the factors which make for this lack of coordination, or disturbance of body balance. Only by understanding the synergies and conflicting forces of our bodies can the desired symmetry of motion, expressed as rhythm, be attained. Arrhythm, then, as it relates to golf, is caused by a lack of control of these forces as they enter into the performance of the strokes.

Obviously, the mechanics of a golf stroke consists of what one does with his or her hands, the body, the feet, and a club. It is no part of the purpose of this article to add to the endless confusion of observations about what one should or should not do with his hands, other than to suggest that the action of the upper extremities, as well as the control of the torso, is largely dependent on the control and support given by the lower extremities, especially of their bases.

Rather is it intended to direct attention to the feet as a factor in the control and maintenance of body balance, or equilibrium; to observe the causes and results of foot strain due to habitually faulty use of the feet, and resultingly, of balance; to comment on the various degrees of foot strains and distortions, as these are affected by and affect the playing of the game; and, finally, to propose the remedy.

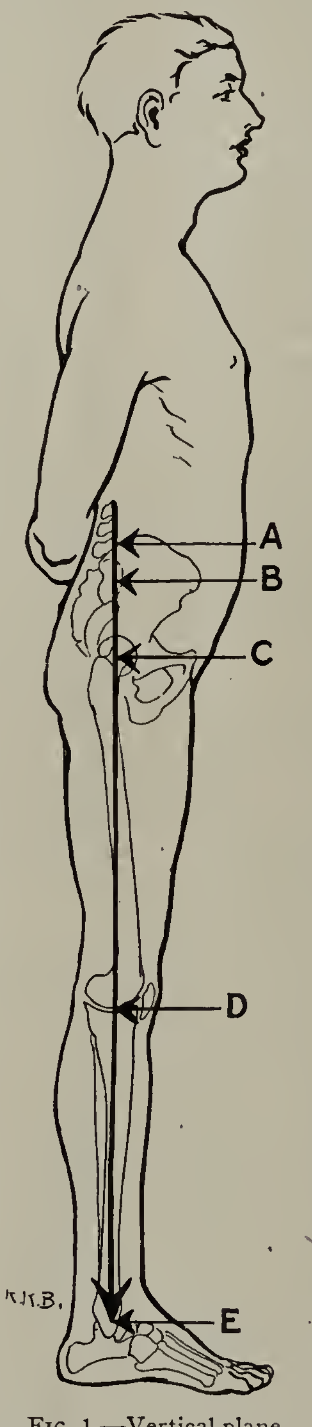

Fig. 1.—Vertical plane passing through the joints which transmit the body weight to the ground.

PEDAL EQUILIBRIUM.

In standing, in walking, or in carrying out any complicated manœuvre of the body, we are conscious of our relation to external objects. Conversely, equilibrium is the motor response to our concept of position. In the erect posture, equilibrium is maintained by our kinesthetic (muscle joint) sense, and any manœuvre of skill is dependent not only on muscles of sufficient strength and tone, but as well on the strength of the tissues composing the joints.

Consider, then, the feet as having to do with the maintenance of body balance. In the normal orthograde posture, the weight of the torso is conveyed along an imaginary plane passing through the lumbosacral, sacroiliac, hip, and knee joints, and finally to the base, the ankle joints and the feet (Fig. 1). For the body to be in its most stable equilibrium, this vertical plane must pass through the centre of gravity of the body (at a point opposite the lower lumbar spine), and fall within the base. The right control and distribution of the resultant forces and of the body weight operating to and through the ankle and foot is dependent, therefore, on pedal equilibrium.

On what arrangement of joint tissues, and forces operating on and to the joints of the feet, does this basic balance depend? The weight of the body is transmitted to the astragalus, retained in its tibiofibular mortise, and the os calcis, with which the astragalus forms the last and only ginglymus, or hinge, joint below the knee. The astragalus, composed as it is almost entirely of articular surfaces, and having no muscles inserted into it, is essentially a weight distributing centre. From the astragalus and os calcis the weight of the body is transmitted along two parallel lines of force, acting as a muscle joint couple through the mediotarsal joint (more properly, joints)—the outer series having the cuboid, the metatarsals and phalanges of the two outer toes, the inner series, the scaphoid, the three cuneiforms, and the metatarsals and phalanges of the three inner toes (Fig. 2).

Purposely, no mention has been made of the four usual designations of the arches of the foot. As they are described in texts on anatomy they are potential, rather than dynamic. The true dynamic arch of the foot is the transverse plane through the four segments composing the anterior tarsus (the three cuneiforms and the cuboid) (Fig. 3), and the articulations of these bones with the bases of the five metatarsals—the anterior tarsal, or transverse, arch. This arch acts as a tie, receiving the tensile stress of the usually described von Weber triangle—the inner and outer ball (the heads of the first and fifth metatarsals, respectively) and the centre of the under surface of the heel (Fig. 4). Here converge and are operative the tractive forces of three principal muscles on which the stability and action of the foot depends—the tibiales, anticus and posticus, and the peroneus longus muscles (Fig. 5). Here centre and are directed the antagonistic actions of the flexors and extensors, the inverters and everters, of the foot. The anterior tarsal arch, therefore, acts as a weight-controlling mechanism of the foot in action.

Two principal extrinsic foot muscles, the long flexors of the great toe and of the four outer digits, together with their reinforcing intrinsic foot muscles, are in control of forefoot propulsion, and resultingly, of balance (Fig. 5). The flexion efficiency of the great toe gives the same relative value to the management of this propulsion, as is the approximating of the thumb to the fingers of the hand.

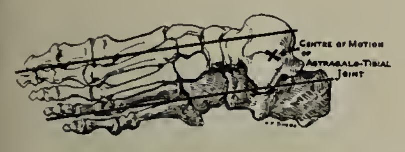

Fig. 2.—The outer (shaded) segments receive the weight of the body in walking. The inner (unshaded) segments distribute the weight, and deliver it forward for the succeeding step.

HABITUAL FOOT STRAIN.

Each of the segments of the foot has a normal, though limited, range of movement, without disturbing its centre of motion in relation to adjacent segments. And when the centre of motion (the convergence of its axes of motion) of any segment or segments is habitually changed, then there is some degree of beginning foot dysfunction. This applies particularly to the articulations of the anterior tarsal arch, which, like those of the mediotarsus, are all arthrodial, or gliding, joints.

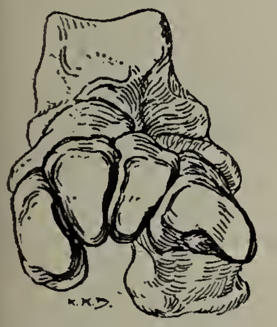

Fig. 3.—The anterior tarsal, or transverse, arch — the three cuneiforms and the cuboid. The minor degrees of shocks to which the foot in walking is constantly subjected is transmitted, like all other arches, toward its buttresses. Alterations of the bony relations of these segments, as a consequent on the loss of prehensile control, marks a developed stage of chronic weakened foot.

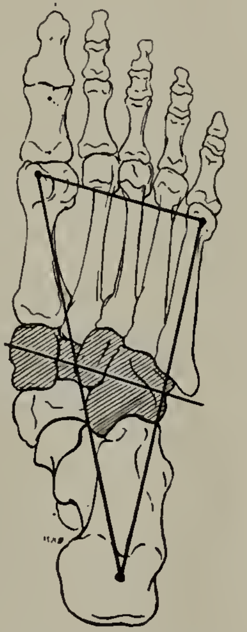

Fig. 4.—The anterior tarsal arch (shaded) acting as the tie of the weight bearing triangle of the foot. It is the transmission and control of the weight through this arch which determines the strength, or lack of strength, of the foot in action.

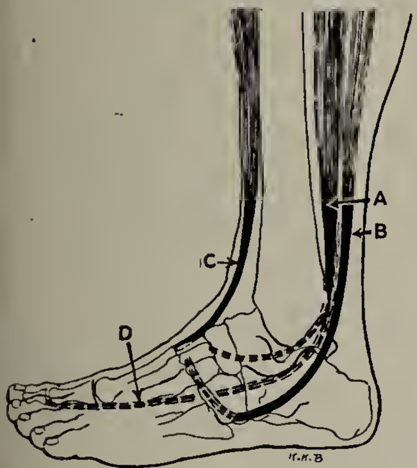

Fig. 5.—Showing in diagram the action of opponent muscles directed to the transverse arch, and the action of the great toe flexor muscle.

When weight distribution is controlled by normal pedal equilibrium there is no resulting foot strain, provided the parts are not taxed beyond their capacity to withstand strain. Again, when all the segments of the foot glide or move within their normal range, and there is the requisite intermittent contraction and relaxation of the muscles, their tendons, and the ligaments of the joints, the foot has attained its greatest possible stability of equilibrium in use.

The prevalence of weakened foot, in its progressing degrees from chronic foot strain to pes planus, needs no comment here. Well enough to attribute modern foot ills to vicious shoes, the shape and fit of which are so often dictated either by prevailing fashion or the shoe salesman; to shoes which are too short, too narrow, or with too high heels; to too short socks or stockings; to constant pressures from walking on hard, unyielding surfaces; to occupations requiring standing—contributing factors, any or all, to foot dysfunction.

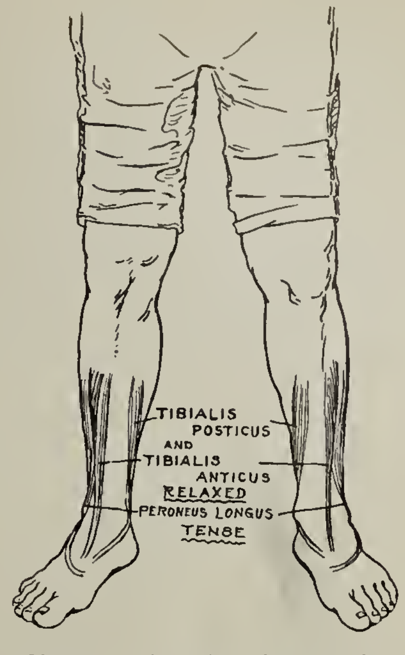

Fig. 6.—The feet in eversion, showing in diagram the lack of control of weight bearing, and of disturbance to normal muscular action. (Compare with Fig. 7.)

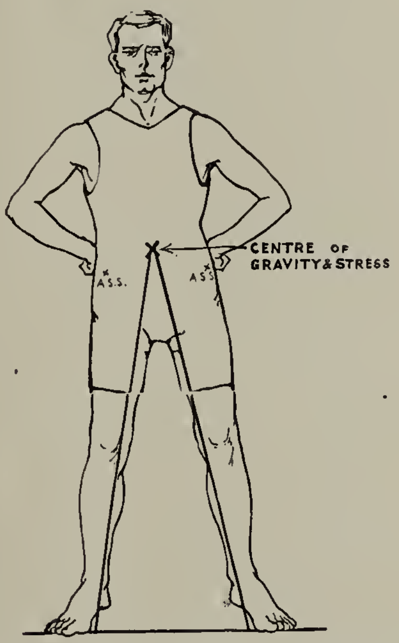

Fig. 7.—The body in balance, the feet positioned so that the weight transmitted through the lower extremity is received entirely within the foot.

On what habitual factor, then, does chronic foot strain, and its concomitant, weakened foot, depend? The degree of weakness of the foot is in direct ratio to the lessening or loss of the prehensile sense and control, which dominates the flexion or grasping action of the forefoot. The development of the all too common everted, or splay, foot is the direct consequence of this lessening or loss of prehensile action. Thus, when the feet are everted, or turned out, the inverter muscles of the foot (tibiales) are comparatively relaxed, and the everters (peroneii) placed unfavorably for normal contraction (Fig. 6). (Witness the frequency of peroneal spasm in advanced stages of weakened foot.)

In order to compensate for lack of muscular strength and of resilience of ligaments the feet assume the broadened base of relaxation,

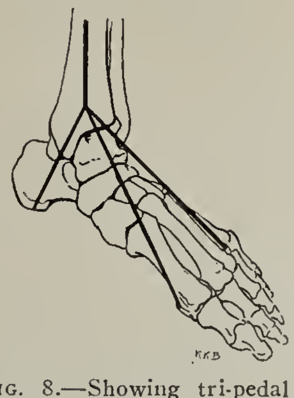

Fig. 8.—Showing tri-pedal base of support, and direction and distribution of the lines of force acting through the astragalo-tibial joint. When the weight in walking is transmitted properly to the heads of the metatarsal bones, these bones act as buffers, or "shock absorbers."

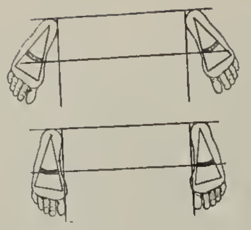

Fig. 9.—The "four square" base of support, giving the greatest stability within the smallest area. Contrasting, the comparative weakness of the base of support when the feet are everted.

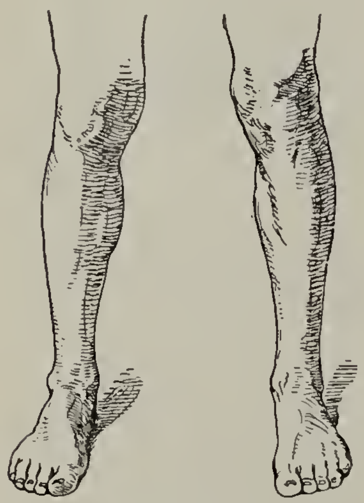

Fig. 10.—a.

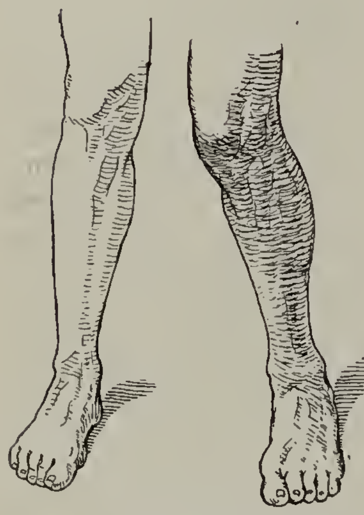

Fig. 10.—b.

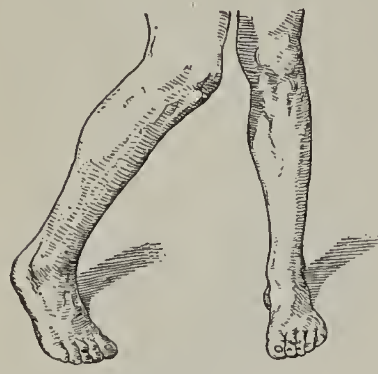

Fig. 10.—c.

Fig. 10.—(Line drawings from photographs.) a, The feet properly positioned; b, the feet as they are positioned when the body is in extreme right rotation, (the "top of the swing"), the entire left forefoot being in contact with the ground, and the left heel raised but slightly; c, the feet when the body is forcibly turned in rotation to the left, the finish of the full stroke, or "follow through."

weakness, inhibition, and the grasping action of the forefoot is thus interfered with. Weakened foot, therefore, has its inception in neglect, lack of control, and resulting inhibition of muscle balance.

WEAKENED FOOT AND GOLF.

The average person thinks little, and apparently cares less, about his feet, so long as they carry him reasonably well through the activities of the day and do not trouble him excessively. He may realize that he walks an average of about five miles a day, but he may not be conscious of the fact that in this distance he takes something over twelve thousand steps, these latter controlling an aggregate of over eight hundred tons.

If this average person happens to play at golf, he interrupts his habitual method (or lack of method) of walking on the hard pave, and changes his usual footwear for shoes which may or may not be best adapted to the purpose. He begins playing by assuming the splay foot position to which he is accustomed, his feet spread apart sufficiently to give him something a sense of balance. After surcharging the mind with the many things he is supposed to do or not to do, then follows the attempt to respond to a most exacting demand for coordination. With the feet everted, and when body rotation to the right has reached its maximum (in golfing parlance, the "top of the swing"), the left foot is bearing the weight imposed on it mainly on the great toe, the outer ball of the left foot not being in contact with the ground at all. Indeed, as will be pointed out later, the stroke is about to be played, as with all the ones to follow, with the feet positioned so as to give them, and resultingly the body, the least possible stability and the greatest stress.

After playing the stroke, walking is again resumed over a greater or less distance, usually less, under conditions of foot usage totally different from those to which he is accustomed. The feet have continually to adapt themselves to yielding and uneven surfaces, to changing planes of inclination. The usual methods of positioning the feet are followed, according to the required stroke, on to the end of the game. At no time have the feet been so placed that they are best adapted to the control of body weight, to the rotation of the torso, to counterbalancing the movement of the arms, and to the application of force. The reason for this will also be demonstrated later. Briefly, in order to attain the maximum of strength and stability each foot must be positioned and used so that the weight is controlled within the foot, along a plane projected forward from the centre of the heel and passing through the second metatarsal bone (Fig. 7). In the everted, splay foot, this plane passes to the inside of the great toe, with resulting stress imposed on the transverse arch of the foot, and inhibition of forefoot action.

Indeed, it is doubtful if the vast accumulation of inhibitory influence, as these affect pedal equilibrium, can at once be adjusted to adequate controls. Feet that are weakened from habitual misuse and neglect, feet that are chronically strained, are not readily adapted to the exacting demands of golf, the playing of which serves only to accentuate the degree of weakness and strain already existing. Is it small wonder, then, that a game so potent of good for the many thousands who play it, brings often only a

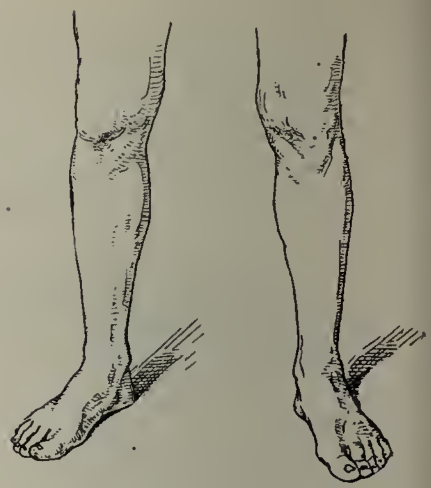

Fig. 11.—a.

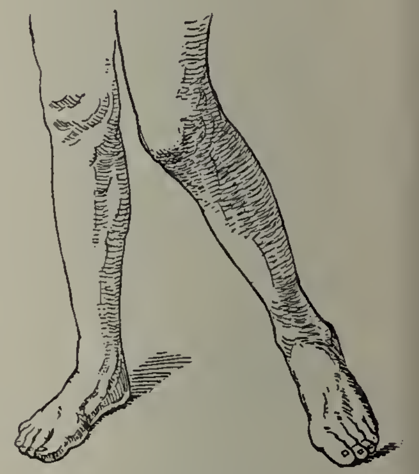

Fig. 11.—b.

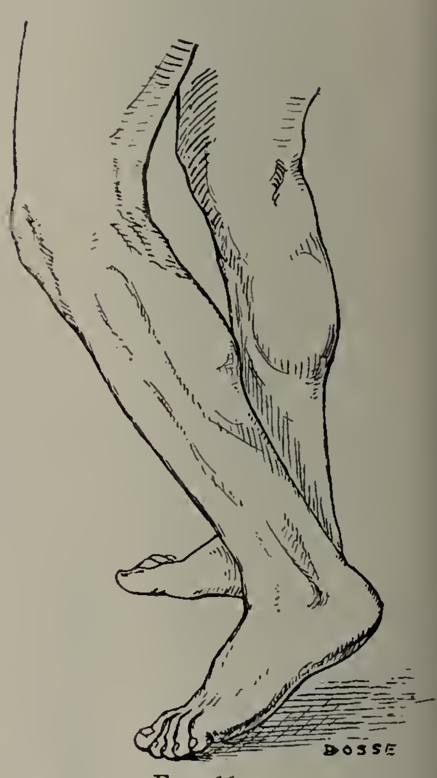

Fig. 11.—c.

Fig. 11.—(Line drawings from photographs.) a, The feet as they are usually, and wrongly, positioned at the beginning of the full stroke; b, at the top of the swing, showing the small, unstable base afforded by the first toe alone, the lack of contact of the outer ball of the left foot with the ground, and the extreme elevation of the heel—all of which creates the least possible stability where this is most needed; c, same as preceding, showing side, instead of front, projection.

modicum of health benefit and enjoyment? So far as concerns the lack of muscle balance and of pedal equilibrium, mute evidences of some degree of foot dysfunction which so many bring to the playing of the game, it would appear that there is something radically and persistently wrong which needs correction.

RESTORATION OF BALANCE IN GOLF.

The anterior portion of the foot operates in controlling the weight directed to it through the lower extremity (Fig. 8). Again, the lower lumbar region acts as the centre of motion of the entire body. Not only is this latter region also the centre of gravity, but as well the centre of stress of the body. In any body manœuvre requiring skill, the accuracy of the performance depends on the control of these conjoined centres. If there be an inadequate base, due to faulty position or lack of intrinsic strength of the feet, there must result a disturbance of the kinesthetic sense dominating the control of these centres—a too rapid or a too slow shifting of the centre of gravity, and with it the centre of stress—and the effort is lessened in its efficacy.

Obviously, therefore, stability of the base is a requisite in the playing of golf. In the back swing, the hands and the club operate together as a counterbalance, directing an arc of motion around the body, and the torso rotates up to a resistance point beyond which no further rotation is possible. At the "top of the swing," the counterbalance of the extended arms, together with the turning of the body, has created the maximum requirements of equilibrium. It is at this point at the end of the arc of motion, therefore, that the greatest stability is requisite. Here the comparative relaxation of the muscles acting in right rotation begins to give place to the contraction of the antagonistic groups, which act as left rotators of the torso. Indeed, it is the sense of disturbance of muscle balance engendered by this change which makes the player tighten up too soon in his efforts to maintain his equilibrium, the left rotators begin their work before the body has completed its pivoting around its centre of motion, and the stroke is thereby spoiled.

How, then, is correct control and coordination to be attained? By positioning the feet at the beginning of every stroke—long, intermediate, or short—so that the ties (anterior tarsal arch) of the weight-bearing triangle of each foot shall be in the same plane, and therefore in alignment, and with the feet separated only enough to maintain equilibrium during the stroke—in other words, the inner margins of the feet at all times form a parallel with each other, the feet being in alignment (Fig. 9).

Thus, under all conditions of play, inclusive of the walking between strokes, the maximum of stability is attained with the least possible joint and neuromuscular stress, whether this have to do with the body or with the feet. The entire left forefoot during right rotation of the body will therefore be constantly in contact with the ground, instead of only the limited base of the great toe alone when the feet are everted (Figs. 10 and 11). There is no hampering of the pivoting of the body, the lateral sway of the hips is practically eliminated, there is the least possible disturbance to the centre of gravity of the body, and there is provided a maximum of force with a minimum of stress and resistance. The power exerted is thereby concentrated and is not dispersed in the efforts to maintain equilibrium. And, finally, the degree of strain is lessened, not only as affecting the feet, but as well there is a lessening of the socalled rheumatic pains, the result of overstress, so often referred to the knee, hip, sacroiliac, and lumbosacral joints as the result of foot unbalance, or disturbance of pedal equilibrium.

CONCLUSION.

It is not within the scope of this article to elaborate the practical phases of the restoration of balance, as they enter into the playing of the game, except to observe that golf needs a new vision and a better understanding. Nor is it intended to suggest changing the methods of players who, due to long practice or a natural aptitude, have attained the desired skill and control, provided the feet withstand the degree of stress to which they are subjected. Rather, its purpose is to direct attention to the lack of physical equipment as this relates to its expression in body equilibrium, with especial reference to pedal equilibrium, which the large majority of golfers bring to this great health pastime.

33 West Forty-second Street.

Massage in Sprains, Dislocations and Fractures

By PIERRE KOUINDJY, M.D.,
Paris, France.

THE THERAPEUTIC APPLICATION OF METHODICAL MASSAGE.

Before we begin the massage of a member, we divide the member into three segments, according to the method of the Russian physician Goliakhowsky, the superior segment, the middle segment, and the inferior segment. For the lower extremity, the thigh is the superior segment, the leg the middle segment, and the foot the inferior segment. In case of the upper extremity, the superior segment is the arm, the middle segment is the forearm, and the inferior segment is the hand.

Massage is begun at the superior segment, followed by the middle and finally the inferior segment. This helps to reestablish the venous circulation and makes the mechanical action more effective. When the three segments are prepared in this manner one may proceed with the massage of the entire member.

In traumatic cases where there is a break in the continuity this method has been modified as follows, dividing the field into three parts:

1. The superior part, which is above the lesion.
2. The inferior part, which is below the lesion.
3. The middle part, which corresponds to the area

surrounding the lesion. The massage is begun with the superior part, then the inferior, and last the middle part.

MASSAGE OF SPRAINS AND DISLOCATIONS.

Tibiotarsal sprain.—The massage may be executed; (1) in the reclining posture or (2) in the sitting posture.

In massage of a sprain of the ankle in the reclining posture the leg of the patient should be placed upon a long cushion in such a way that the external anterior surface of the leg is turned upwards. The part to be massaged is divided into three parts; (1) above the articulation; (2) below the articulation; (3) the articulation. Complete massage for the superior part, superficial and profound rubbing, pressure, kneading, percussion, and if possible patting and vibrations (manual and mechanical). Partial massage for the inferior part, the foot, rubbing and pressure, mostly digital, along the tendon sheaths. The massage of the foot is terminated by bracelet rubbings.

After three or four days the third part of the massage is begun; superficial and light rubbing all about the articulation, light circular pressures, followed by profound pressure. Finally when the pain has abated we terminate each session by a general massage of the entire limb which consists of profound rubbing and pressure. Later we apply patting and kneading to the peroneal group of muscles and to the flexors of the foot. The posterior surface of the leg, the thigh, or the plantar surface of the foot should not be massaged.

At the termination of each session of massage, passive, active and resistance movements are applied for a very short time, and methodical movements are applied to the ankle. In order to keep the articulation in position a band of elastic tissue with lateral traction is applied in order to exaggerate the rotation of the foot outwards.

The application of this band requires a certain amount of dexterity, a special turn of the hand, placing the band about metatarsus so as to draw the foot outwards. The bandage is started at the base and carried upwards above the tibiotarsal articulation; while the heel of the foot is held with one hand, the band is brought up the inferior third of the leg. The bandage is then given another turn about the heads of the metatarsus and again around the leg. This forms a stirrup in which the foot is firmly held. Then we draw on the band while the foot is placed in forced outward rotation.

This position is fixed by extra turns of the bandage which is carried high up on the leg. In this way the foot is held in a position of rotation and outwards, where it is held for the required period. In any case, this position leaves the peroneal muscles free and prevents the foot from turning inwards.

In the sitting posture, the foot is placed on a stool. The field of operation is divided into three parts as in the preceding case.

I prefer the reclining posture, because in this posture the patient becomes less fatigued.

In case of large vascular exudations, padded compression should be applied after each massage. Preceding each session a hot bath should be given; this will hasten the recovery which varies from four days to two weeks. The foot should not be held immobile for a prolonged period, and no plaster appliance should be used.

Sprain of the knee.—In sprain of the knee three sections are massaged, the thigh, the leg, and the knee. Complete massage for the thigh includes rubbing, pressure, kneading with rolling and pressing, patting and percussion. Do not massage the posterior surface. Complete massage of the leg includes the anterior external surface only. Finally partial massage of the knee; begin with superficial rubbing, and light pressure; massage of the lateral ligaments of the knee and about the patella, where it is well to apply gentle pressure in order to hasten absorption of the exudate. Terminate the treatment by general massage of the entire leg.

It is important at the beginning of the treatment to establish compression by using a Velpeau bandage. Later after the reabsorption of the infiltration, and the pain has lessened, methodical movements alone are employed.

Sprain of the wrist.—In a complete massage of the superior portion of the forearm, avoid the flexors of the fingers if there is any contraction of these muscles. For partial massage, rubbing and pressure of the inferior portion of the hand. Finally slow and circular pressure on the ligaments of the carpal and the lateral ligaments; digital pressure upon the articular interspaces. From time to time palmar pressure is applied in order to stimulate the absorption of the infiltrations of the articular capsule. When the pain has perceptibly diminished, massage of the entire member may be started. This should always be in the direction of the venous circulation. The massage is terminated by passive movements, methodical movements, active and resistance movements.

In executing the massage for sprains of the wrist it is well to examine the carpal bones to determine whether there are any displaced. In this case it is well to employ stronger pressure upon the displacements in order to obtain a reduction. Often it is necessary to reduce the intraarticular exudates in order to facilitate the replacing of the bone to its normal position.

Sprain of elbow.—Complete massage of the superior portion, the arm and especially the triceps, as the biceps are often found contracted. Complete massage for the inferior portion, the forearm, the two antagonistic groups at the same time. Finally apply partial massage of the elbow. Here pressure and rubbing are of great assistance, rubbing for the entire region of the elbow. Digital pressure with the two thumbs below the olecranon process and simultaneously upwards, turning at the bone and ending at the two condyles of the humerus. At the olecranon cavity we should stop a bit and apply permanent digital pressure in order to relieve the congestion of the cellular tissue, which has filled the cavity. Complete the massage by passive movements. At the beginning of the treatment one should avoid active resistance movements. It is well to have the patient use his arm as soon as possible.

Dislocation of the shoulder.—As for the sprains, I select the most common types of dislocation in order to describe massotherapeutic intervention. The reader may establish his own method for the other dislocations from this one.

Massage for the dislocation of the shoulder should not be attempted until after the complete reduction of the articulation. Massage should begin immediately after reduction. The patient is seated in a chair. The operator assumes a position facing the shoulder of the patient. Begin with rubbings of the trapezius, the deltoid and the other periarticular muscles. This is followed shortly by light pressures. The trapezius is massaged from above downwards, the deltoid from below upwards; the middle portion vertically, the anterior and posterior portions of the humeral insertions towards the clavicle and towards the spine of the scapula. Massage the muscles above and below the spine from without inwards and in the form of a fan; massage the rhomboid muscles obliquely from the vertebral column towards the scapular insertions.

After several sessions of this massage, when we judge that the articulation is strong enough, we change from the rubbings and pressure to kneading, vibration and even patting, in the same way as for the methodical movements of the shoulder.

The active movements may begin when the movements have obtained a certain amplitude. Later the patient should attempt to take his arm out of the sling two or three times daily and attempt a few movements of abduction, flexion and extension. The arm should be carried in front, to one side and behind the body. Never neglect to put the arm in a sling after each session, especially at the beginning of the treatment.

It should be noted that often the articulation shows a certain amount of enlargement of the articular capsule, due to the congestion of the fibrous tissue of the articulation. In order to relieve this congestion it is necessary to employ digital or palmar pressure about the entire articulation, and a little more about the bicipital groove, where the tendons of the biceps are found.

The first sessions of the massage for the dislocation, as for all other dislocations, are destined to cause the absorption of the exudates. At the other end we utilize profound rubbings and pressure. If the infiltrations persist, we should resort to stronger measures, profound digital pressures, and at times grinding movements.

Dislocation of the elbow.—The same massage is applied for dislocation of the elbow as for sprain of the elbow, this being but an exaggerated form.

Dislocation of the wrist.—The same treatment is applied for dislocation of the wrist as for sprained wrist.

Dislocation of the fingers.—For dislocation of the fingers apply massage after reduction; rubbing, pressure, and methodical movements. It is useful to apply a bandage after each session of massage until the disappearance of the edema.

METHODICAL MASSAGE OF FRACTURES.

At the beginning of the world war I showed in an article published in the *Presse Médicale*, of August 26, 1914, my method for the treatment of fractures. I think that this method is the most rational one in use at present. I shall quote here that part of the article which deals with the treatment of fractures in general. "For us, we say, all fractures after their reduction should be placed in an immobile apparatus for a period varying from three days to three weeks, that is depending on their location; for example, fracture of the ulna or malleoli. After this we may begin the massage. The limb should be carefully taken from the plaster or apparatus and replaced with the same care. In order to massage the wounded member it is placed either upon a cushion of sand, or upon a blanket folded into eight thicknesses, and so far as possible in the same position as it was held in the plaster. The field of massage is divided into three parts; above the fracture; below the fracture; and the region of the fracture. The first portion is always massaged first. The only thing done during the first session is superficial and profound rubbing, executed gently and without effort. The same treatment is used for the second part. Do not touch, during the first session, the region where the callus fibres are located, in order not to cause hyperformation. The session of massage should terminate by rubbing the entire member, and avoiding touching the middle portion.

"The first sessions should not last longer than ten or fifteen minutes. The wounded member is replaced, with all the necessary precautions, into the plaster. On the first day of the massage the limb is taken out of the plaster cast and the cast is replaced by an ordinary bandage or a Velpeau bandage. In this way a gradual progressive compression is caused for the entire member.

"In the following sessions the preceding maneuvers are completed by pressure, percussion and the kneading of the muscle mass. All of these maneuvers are destined to combat the muscular atrophy occasioned by the immobility of the member. Finally we employ movements of the articulations, preceded by passive movements of the distal articulations.

"It is not until later, when the fracture is almost completely consolidated, that we begin the passive movements of the articulations adjacent to the fracture. Methodical massage notably shortens the duration of the treatment of fracture. It is important not to retard its application.

"As soon as we consider the fracture entirely consolidated, the cast may be abandoned and the movements of reeducation begun, for immobility, when more or less prolonged, causes a certain incapacity of movements in the wounded member. It is necessary to teach the patient simple movements, followed by more complicated movements. This way he will recover the functions of the muscles as rapidly as possible. Mechanotherapy, no matter how rudimentary, renders a great service.

"It is to be noted that the advice here given at the beginning of the war was not everywhere followed, for there are a great many cripples who, due to the rapid treatment of fractures among our wounded, present at times multiple ankylosis, vicious consolidations impossible to correct, and one is often disposed to inquire whether the wounded were looked after by a man who possessed the art of healing."

The preceding generalities are, it is understood, for application to the fractures of the larger bones, double fractures and complicated fractures. When the fractures are simple, as fracture of the tibia, metatarsal, etc., the plaster may be replaced by splints, or padded zinc gutters, or wire frames.

Fracture of the clavicle.—At the beginning of the treatment of fracture of the clavicle massage without moving the articulation of the shoulder is used. On the first day, if the general condition of the patient permits, I begin the movements of the articulations of the fingers, the wrist, and the elbow. At first the deltoid is massaged, rubbing with gentle pressure; massage of the trapezius, from above downwards, and the clavicular region with rubbing and digital pressure. At the end of from five to ten days of massage of all the periarticular muscles, profound rubbings, kneading and manual vibrations are begun. When the fracture is sufficiently consolidated, begin methodical movements of the shoulder.

Fracture of the scapula.—In this case partial massage of the periarticular muscles is applied. Avoid profound pressure and kneading of the infraspinous muscles, especially during the first four or six sessions. No movements of the shoulder should be made at the beginning of the treatment or before the wound is entirely healed. When the pain has ceased, profound pressure may be employed as well as kneading. The movements of the distal articulations may be started at the beginning of the treatment. Active and respiratory movements should terminate each session. A sling is applied at the beginning of the treatment, which may be taken off when the consolidation is complete.

Fracture of the humerus.—Massage of the deltoid: rubbing and pressure. Massage of the supraspinous and infraspinous groups of muscles: the pectoral and trapezius muscles. Massage of the triceps. Massage of the biceps is to be avoided in case there is a tendency to contracture. Massage the elbow and completely massage the forearm.

Treatment is begun by massaging the portion situated above the fracture; then the portion below, and the middle portion is not touched before the consolidation is complete. One must insist upon the movement of the wrist and fingers while the arm is held in the immobile position.

The methodical movements of the elbow and shoulder are begun as soon as the wound is practically cicatrized. The massage of this fracture is terminated by a general massage of the entire arm, superficial rubbing, and profound bracelet rubbing.

Fracture of the inferior extremity of the radius.—Place the forearm which has been taken out of the plaster or the splints upon a cushion which has been placed on a table or upon the knee of the operator. Institute partial massage, rubbing and pressure, of the two portions, superior and inferior. Never neglect to massage the hand. Use no movements during the first two or three sessions, except for the articulations of the shoulder and the fingers. Follow this by a moderate movement of the neighboring articulations—the shoulder and the wrist. At the moment it is possible to utilize the rubbing, pressure, kneading and vibrations, they are added. Later percussion of the fleshy part of the muscle mass is used. Insist upon digital pressure on the tendons, the ligaments, and the interossli muscles. Terminate each massage by a general massage of the hand and forearm, and if the immobilization has been somewhat prolonged, add massage of the arm.

Fracture of the bones of the hand.—Institute complete massage of the muscles of the forearm, extensive and profound pressure in order to cause the diffusion of the infiltration. Massage the tendon sheaths by profound and rectolinear pressure. Rub the hand and forearm. Use movements of the articulations of the wrists, the elbow, and all the fingers. Terminate the session by a general rubbing massage of the entire member.

Fracture of the fibula.—Disengage the leg gently from the splints or cast and place it upon a long cushion, with the anteroexternal surface facing upwards. Massage the peroneal groups of muscles and the extensor muscles of the toes. At first superficial rubbings are given, followed soon by superficial pressure, but at the end of the third day the same movements are made profound, and kneading is added. Begin by massaging the superior and inferior portions first, as in massage of the foot. Finish by complete massage of the entire region. Movements of the knee, the toes, and the hip are begun early. A Velpeau bandage should be applied in the same way as applied for the sprains, that is, if there is any tendinous relaxation of the articulation.

Fracture of the femur.—The massage should begin after the bone has been consolidated. From time to time the limb may be subjected to a slight palmar rubbing when it is removed from the plaster. This will help dispel the infiltrations. If the fracture does not show any complications three weeks after the fracture massage may be started. In this case the leg is carefully removed from the plaster and placed upon a cushion or folded blanket. The leg should be kept in the position in which it was held by the plaster. Begin by rubbing the section above the fracture with superficial and profound rubbings; these tend to diminish the pain and disperse the infiltrations. The inferior section is then rubbed, that is, the part situated below the fracture, without touching the callus, during the first few sessions. Later proceed with massage practically complete in the leg and by rubbing and superficial pressure of the area of the fracture. Then kneading and percussion for the muscles are added, and profound rubbing and vibrations for the fracture; finally movements of the neighboring articulations—the hip and the knee. But in the meanwhile one must not forget to move the distal articulations—the ankle and the toes.

The movements of the other leg should also be made as a preventive. The war has shown many weird phenomena which have been caused by prolonged immobilization. I have often been puzzled when finding that the fracture of one leg often caused stiffness and even partial ankylosis in the other leg. So, it is better to move the uninjured leg than to encounter disagreeable surprises later. Until the leg has recovered sufficiently to allow the patient to get up, it is best to retain the plaster, but considerably reduced or transfer to a simple maintaining apparatus which is left off as soon as the patient is able to get up.

From this time on the leg is submitted to a complete methodical massage. I begin by rubbing the buttock muscles as soon as the patient is able to be partially turned. In the massage of the buttocks energetic measures are employed, that is, rubbing, profound pressure, kneading with grinding, patting and percussion. After the patient is brought back to his original position I massage the quadriceps, sartorius, and in case of absence of adduction—the adductor muscles. I abstain for some time from massaging the flexor muscles of the leg and the thigh. To massage the anterior surface of the thigh I resort to rubbing, pressure, patting, percussion, vibration, and above all rolling.

Each session is terminated by passive movements; abduction and adduction of the leg, flexion and extension of the leg upon the thigh, the thigh upon the trunk; circumduction and rotation of the coxofemoral articulations. Active movements: above all insist upon those which are absent or badly executed by the patient. Resistance movements.

Fracture of the tibia.—Movements of the hip and articulations of the toes should precede the massage. Rest the leg upon a cushion or folded blanket, massage the muscles of the anteroexternal surface of the leg. The posterior surface of the leg should not be massaged as long as one is not sure that the fracture has not caused a contracture—even partial—of the Achilles tendon or a contracture of the extensors of the foot. At the beginning apply a partial massage rubbing and light pressures, and finish by a complete massage, except rolling which is difficult here.

Passive movements of all the articulations; insist upon movements of the ankle joint; do not forget the outward rotation of the foot. If there is a simple equinous make traction upon the Achilles tendon. Here I use various methods: (1) That which I have indicated in methodical movements. (2) The method of the chest.

The method of the chest consists in the following manipulations: The reclining posture is preferred. The operator assumes a position opposite the plantar surface of the patient's foot. He grasps the heel of the patient with both hands, leaving the tendon free, and places the plantar surface of the patient's foot against his chest. He then executes the following movements simultaneously:

1. Pulling firmly upon the heel which is against the chest.
2. Pushing the plantar surface of the foot with the chest.

Fracture of the inferior extremity of the leg.—When the leg is placed upon a cushion or a folded blanket, the portion of the leg above the fracture is massaged first—rubbing, pressure, and kneading of the fleshy part of the muscle mass. Then the portion below the fracture is massaged—rubbing, pressure and vibration. The articulation is next massaged—bracelet rubbing, digital pressure, which activates the absorption of the exudate and infiltrations in the tendon sheaths. Terminate the session with a general profound rubbing of the entire member, especially the articulation of the foot on the leg. At the same time passive movements are begun; at first, flexion and extension; abduction, adduction, and rotation later; and finally circumduction.

A bandage is of great assistance here. Terminate the treatment by reeducation of the patient's walk as in all cases of fracture of the inferior extremity. This treatment is described in a later section.

Fracture of the metatarsal bones and the toes.—The treatment for fracture of the metatarsal bones and toes does not vary from the massotherapeutic treatment given to the fractures of the fingers and the long bones. As the dimensions here are much smaller, all of the maneuvers here are done with the fingers and not the hand.

MASSAGE FOR STIFFNESS AND ANKYLOSIS.

Stiffness, stiffening, fibrous ankylosis and complete ankylosis are but different phases of the same process. They are as a rule all due to prolonged immobilization. From the massotherapeutic point of view, it is of little importance to differentiate these pathological forms. We will give a general description of the massage which may be applied to all of them. It is understood that each form requires an application more or less vigorous—more or less complete, following the indications of each individual case. As a technical intervention they are all the same except that of a subacute or chronic arthritis.

Stiffness and ankylosis of the shoulder.—Massage the trapezius from below upwards; rubbing, pressures, kneading and percussions. Massage the deltoid; partial at the beginning; rubbing and superficial pressure, followed by complete massage. Use the same process for the massage of the periarticular muscles. Retard the massage of the pectoral muscles until sure that their antagonists are not atrophied. In this case, in order to avoid augmenting the contracture of the pectoral muscles, only massage the atrophied antagonists.

Massage of the articular capsule; profound circular digital pressure, especially of the ligaments of the tendon of the biceps. Massage the triceps, which always have a tendency to hypotonicity. Massage the dorsalis major.

Methodical movements should be given before massage. Follow the session of massage by passive, active and resistance movements. Gymnastics and reeducation are of utmost importance here.

Stiffness and ankylosis of the elbow.—Always begin by methodical movements. Massage the muscles of the arm, except the biceps, which have a tendency to contract. Massage the muscles of the forearm and the articulation as well. Here I utilize superficial and profound circular digital pressure and massage along the ligaments, especially in case of infiltrations, also palmar pressure and profound rubbing. Make use of combinations: profound pressure with one hand and rubbing with the other, executed simultaneously. The one action does away with the swelling and the other conducts the products to the blood stream.

Terminate by passive, active, and resistance movements.

Stiffness and ankylosis of the wrist.—Rubbing and pressure of the forearm to hasten the removal of the infiltrations. Complete massage of the muscles of the forearm. Partial massage of the wrist and hand. Make use of profound pressure for the articulation, and terminate by combating the tenositis of the ligaments and tendons. Passive and active movements should be accompanied by traction on the flexor and extensor tendons.

The methods indicated in the chapter on movements are sufficient in this case. I vary here the process of the "chest" which has been described. The palmar surface of the hand is placed on the chest of the operator, who holds it with one hand and with the other hand he presses the forearm from above downwards, holding it just above the wrist.

In certain cases, when the retraction of the flexor tendons of the fingers is marked, I utilize a method which serves at the same time as a method of exploration. This condition may be present in neuritis of the radial or ulnar nerves, in hemiplegia, or in spasmodic contractures. The process consists in straightening the fingers when the flexion of the hand upon the forearm is at its maximum. First of all the wrist is put in complete flexion. Then the fingers of the patient are grasped and placed in extension. When this is done, the hand of the patient is lifted, grasped by the palmar surface, and swung from above downwards around the horizontal axis of the radiocarpal articulation.

If the tendinous retraction of the flexors of the fingers is not definitely marked one will find that he has brought the articulation back to the normal condition, after a few exercises of this kind. In any case, some gain is made, but if the contracture exists and once the hand is left, the fingers will always remain more or less flexed.

This process serves as a method of exploration for the degree of contracture of the flexors of the fingers. When we forcibly flex the wrist of the patient we can determine if he can straighten his fingers completely, or whether the contracture is accompanied by a partial retraction of the tendons in their course. It is sufficient to lift up the hand of the patient; in the first case the extension will be partially maintained, while in the second it will be completely absent.

Stiffness and ankylosis of the hip.—Apply complete massage to the buttock muscles, complete massage of the quadriceps, including rolling and grinding movements; complete massage of the posterior muscles of the thigh if there is any sign of atrophy, if not abstain from massage, especially at the beginning of the treatment.

As the articulation is deeply placed, it is difficult to reach in its entirety, by massage. The inaccessible parts should be attacked by profound pressure.

Always begin by movements of the articulation. If the ankylosis is complete, it is useless to attempt movements. In case of partial ankylosis methodical movements are indicated. In case of chronic or subacute arthritis, employ passive movements—gently. The treatment is terminated by active and resistance movements.

Stiffness and ankylosis of the knee.—Begin with methodical movements. Complete massage of the quadriceps. Do not massage the posterior muscles of the thigh as long as the tonicity of the quadriceps remains subnormal.

Massage of the articulation, preferable with the two thumbs. Follow the plan which has been indicated for the massage for sprain of the knee—passive, active, and resistance movements. In case of arthritis insist upon massage of the capsule and the lateral ligaments.

Stiffness and ankylosis of the ankle joint.—The methodical massage of the articulation should precede the massage. The treatment is the same as that in the case of a sprained tibiotarsal articulation, except in the first period, where it is necessary to give partial massage, but not in this instance. Give complete massage of the anteroexternal muscle of the leg, the foot and the articulation as well. For the latter I prefer to employ digital pressure, profound and circular. Passive movements in this case are always accompanied by traction of the Achilles tendon, by the chest method which has been described. Terminate the session by large profound rubbing of the entire leg. This is designed to reestablish the circulation of the inferior extremity.

32 RUE DE LIEGE.

Exercise in Acute Infectious Arthritis

By SAMUEL W. BOORSTEIN, M.D., F.A.C.S.,
New York.

The rapid progress of orthopedic surgery, especially during the recent war, has revolutionized many of our old dogmas of exercise in the treatment of diseases. Willems, with the mobilization treatment of knee infections; Rollier with the sun treatment; particularly Sir Robert Jones in his repeated encouragement of the value of occupational therapy; the institution of early motion in fractures and exercises in acute cardiac disease by many authorities, has raised the value of exercises to its deserved appreciation.

A great deal of space is given in the medical literature to this work though the medical schools have not given it proper place in the curriculum.

There are, however, some chronic diseases, or rather acute ones which are allowed to become chronic, where the value and need of exercises and occupational therapy have not been emphasized sufficiently. Among those diseases is the acute infectious arthritis or what the laity calls rheumatism. In this disease the old theories are still followed.

In a previous article (1), published in 1912, reporting the early results of work on arthritis deformans by Dr. G. R. Elliott and myself at the Montefiore Hospital, I stated the following:

"It has been shown that the deformities of arthritis deformans are more marked in the well to do people, because they can afford to remain in bed and be supplied with all the necessities by their servants. The result is that they become bedridden very early. The joints gradually become deformed and flexion is prevailing. The poor patients, on the contrary, have some employment as housework or finding means of existence and, therefore, are in constant motion and thus prevent deformities. The slight trauma produced by the constant maneuvering is not enough to forbid the continuance of daily work."

Since that time I have followed the phase of treatment with great interest. Up to the present time I have found no reason to retract my statement but, on the contrary, am more enthusiastic. The different experiments carried out by myself and the articles published in the literature have added proof to the assumption formerly expressed.

This article is written for the sole purpose of interesting the general practitioner and the laity and thus avoid disabilities, which are not only a drain upon the patient's immediate family, but also on the country at large.

To have a proper and clear idea of the class of cases under consideration, we include that form of arthritis formerly called arthritis deformans and by the English writers called rheumatoid arthritis; at present called acute polyarthritis, which usually terminates in chronic progressive polyarthritis (monoarthritis is of course included).

The laity, as well as the general practitioner of the old school, still designate it by the old preposterous term rheumatism. This alone helps make the patient submit willingly to permanent crippledom.

The technical definition is: A polyarticular affection (monoarticular can be included), beginning either acutely or insidiously, generally involving in a symmetrical manner the distal joints of the fingers and extending to other joints in more or less rapid succession. It usually begins with a rise in temperature (though this may be absent and not noticeable); pain which is the predominant symptom and occasionally swelling.

One should at once take into consideration the age and sex of the person afflicted. Excluding cases where the infection is found in the joint directly, this disease is much more prevalent in women, and in adults. The disease commences most commonly between the ages of twenty and thirty, occasionally even before twenty.

We thus see that the disease is common in a class of people that are by nature, in a modern civilized country, more indisposed to work, more neurotic and more accustomed to visiting and consulting physicians.

The psychology of the patient, i. e., whether she really has the desire to be cured and whether she is anxious to give the physician the proper assistance, plays an important part in the prognosis. It must be borne in mind that many cases are erroneously traced to a slight injury, for which the patient sues for compensation. In these the patient is not willing to exercise during the acute stage, when pain is still present. The present cases of the War Risk Insurance Board demonstrate this only too well.

It is not necessary to dwell on the etiology, as this is beyond the scope of this paper. We may only review briefly the treatment. Besides looking for the source of infection and removing it where possible, the joints are usually put in plaster splints for a short time—(ten days). Then baking, massage, and other measures are instituted. It is just at this stage that the exercises, properly directed, should be begun and followed up for a long time. This prompt commencement of exercises prevents deformities and disabilities.

Pathological changes are as follows:

1. The morbid process begins in the synovial and periarticular tissues, which undergo thickening, with abundant villous proliferation and new formation of bloodvessels. The cartilage, at any rate in the early stages, remains intact.

2. The changes that ensue in the cartilage and in the end bone are to be regarded as secondary.

3. In some cases proliferative changes take place in the bony and cartilaginous structures, giving rise to irregular bony outgrowths at the level of the articulations.

4. The terminal stage is marked by shrinkage of capsule, with obliteration of the joint cavity and ultimately fibrous or even bony union of the articular ends of the bones.

One must also keep in mind the conclusion of Nichols and Richardson, that the infectious agent is usually of a low virulence and these result in a local anemia from endarteritis of more or less obliterating type. This is followed either by proliferated or degenerative changes in all the joint structures, tendons and muscles.

We thus see that in the acute stages the soft parts, namely, the fibrous and synovial capsules, are involved and they tend to form adhesions and cicatrization, and cause the deformities which are so disabling. In many cases of severe infection, the joint cavity is entirely obliterated. The adhesions between the two layers of the synovial membrane are so firm that no force will separate them.

In former years exercise used to be considered distinctly harmful, for the writers believed that exercise tended to increase the adhesions and cause ankylosis. At present the opinion is reversed—that the exercise will prevent adhesions, the increased circulation will cause elimination of toxins.

Willems's observations on acute septic knee can easily be applied here. According to him and all those who have followed his work, "even in purulent arthritis excellent results are obtained by immediate active mobilization." He advises a unilateral or bilateral arthrotomy followed by immediate active motion of the joint, even instructing patient to walk after the temperature has fallen below 100° F. and while the joint still has a large opening.

We will quote a few authorities on the value of exercise in acute arthritis thus showing the modern tendency in these cases:

Lewellyn Jones (8), in his excellent treatise on arthritis deformans states emphatically: "It need hardly be said that the patients must be got out of bed as early as possible and encouraged in every way to use their joints, which otherwise become increasingly stiff. In the chronic cases, regular exercises, proportionate to their power, should be insisted upon. Great firmness is necessary to insure exercises being regularly carried out, as it is by no means easy to convince the patient, when in pain, of the necessity of perseverance in this direction if future crippledom is to be avoided."

Painter, Goldthwaite and Osgood (7), who have done so much original work on arthritis writing in connection with infectious arthritis, state: "Passive and active manipulation are frequently required, even at the cost of considerable suffering to the patient, before the desired result is obtained. . . . Patients are all likely to become more or less neurasthenics and require constant incentive in order that the best results may be secured. A great deal of the success of treatment depends upon the cooperation of the patient in every detail."

Sir Robert Jones (10), lauding occupational therapy in injured soldiers, says, and his words can be paraphrased easily and we can agree with him that "She would cheerfully spend the morning grasping a big duster and cleaning windows. Her mind is set on the dirt she has to remove, not on the fact that her maimed hand is repeatedly taking hold of and letting go the duster. If the patient is in an atmosphere of work, she soon recovers some hold of herself and wishes to do something, even to make beds for patients."

In a recent article on acute polyarthritis (4), I have stated emphatically, "Active exercises are of great value. As soon as inflammation begins to subside, have the patient himself go through the normal range of motion of the joint two or three times a day and perform each motion about five times."

Even if in spite of proper treatment some ankylosis or deformity becomes inevitable, the limbs are in a better position and the muscles are in better tone and can perform a great many more normal functions.

The only questions at present are: 1. When to begin the exercises. 2. How to carry out the exercises. 3. Forms of exercises. 4. Guarding against overuse.

WHEN TO BEGIN THE EXERCISES.

Authorities agree that active exercises are the only ones that can help restore the person to proper health. The patient must be encouraged to do the exercises himself, do them often and do them regularly. The physician, with all his persuasive power, is not always able to control the patient and get the proper cooperation. As stated, this disease is common among women between the ages of twenty and thirty. It is well known that women at that age want a great deal of sympathy when they are sick. It can almost be said of modern women that they take pride in being sick.

The desire for independence enters frequently in connection with this disease. In spite of the general theory of woman's desire for independence, the orthopedic surgeons, the neurologists and social service workers are aware more than others that if a woman can find any pretext for not working, she does not work.

If the case is the basis for a legal controversy as suing for damages because of an accident or under the workmen's compensation or fighting a will, the slightest deformities are usually exaggerated to the extreme and some of those assumed.

In a previous article (2), in 1912, I stated: "Exercises must be insisted upon and should be begun as soon as signs of acute inflammation have subsided. Active and passive movements are of great advantage. It is quite hard to induce the patient to do the exercises which really cause pain, but the physician must use his utmost influence to persuade his patients to continue it regularly. Most of them are neurotic and with these such advice is easier given than followed. With older patients, specially women, this persuasion is more difficult."

In the ten years that have passed since the writing of this article my belief in these conclusions has been strengthened.

The active exercises should be begun while the patient is still in bed and while the joints are still inflamed, but of course the patient should be encouraged to use them himself only for a few motions.

HOW TO CARRY OUT THE EXERCISES.

I wish to emphasize here that in spite of the strides made in this disease where the source of infection is carefully sought and removed, also the excellent work with baking, massage, etc., our duties as teachers have not been fulfilled unless the laity understand definitely that many of these cases can be improved early or at least the marked disability and deformities may be prevented.

The patient should help and continue to help and not leave the active work towards her recovery entirely to the masseuse, nor should she depend upon the much advertised but valueless springs and leave to the Almighty, who gave such a wonderful spring, to do the work Himself. "There is no balm in Gilead" may be used as an argument against those springs.

The motions should be begun while the acute inflammation is beginning to subside and the patient should do them herself. These motions will be found to be less and less provocative of pain and productive of a greater range of motion as time goes on. It is at this period that the teacher of occupational therapy should be employed, so that the exercises may take some useful and interesting form while the extent is under proper control.

We have not yet reached the stage where it is customary for an orthopedic surgeon to send a teacher of occupational therapy regularly with orders as we now send a masseuse. In an institution, teachers are already obtainable but are not yet available for private cases.

Many exercises can be performed in the house without a teacher, such as washing dishes, cleaning glassware (the care that she has to take of the valuable glass will encourage her to use the hands properly).

As soon as the patients can sit up in the chair, the extent of occupations can be increased; as soon as she can walk, the question of housework should be taken up. Among the poor this does not come up. As quickly as possible, she washes the dishes, sweeps the floor and prepares the meals for her poor and unfortunate husband. She only asks the physician: "Am I permitted to wet my hands?" I cannot trace exactly where the idea originated that it is forbidden to moisten the hands. At present hot water is so easily obtainable that it is hardly probable that a woman would wash greasy dishes with cold water. Why could she keep her hands in hot water for a treatment or put a hot water bottle to her hands and not wash the dishes?

Of course with the rich class housework is out of the question. They are finally convinced that God has given them delicate hands to wear rings and loll in rocking chairs, and even the supreme duty of keeping her infant on her hands she leaves to a maid or a nurse.

This is not a lecture on economics and thus it must be shortened. It is, however, a plea for more natural exercises and work in this only too common affliction; and it is just as much of a hospital question as an economic. Orthopedic surgeons who have to do with chronic cases know too well that these cases are a burden in the acute hospitals, a hardship in the hospitals for chronic diseases and certainly a struggle for the family. One patient with chronic arthritis is a great burden to the family and will often ruin them completely, besides neglecting her husband and children.

Of course active exercises can best be performed under the guidance of occupational therapy teachers, who can at first select occupations to be used by the patients while in bed and later on some others, when the patients are able to leave their beds.

FORMS OF EXERCISES IN OCCUPATIONAL THERAPY.

We must at first choose the line of work that will help that particular deformity, to carry out this work intelligently.

I undertook, in conjunction with Miss Johnson, lecturer at Teachers' College, to select a distinct group of work suitable for these cases. We have always to keep in mind not to give them occupations that may increase the tendency to deformity.

We will take up each motion found in normal people and give them occupation suitable for that.

I—UPPER EXTREMITIES.

(1) Finger flexion and extension. We abandoned sewing, knitting and crocheting with fine needle, as this is tedious and causes flexion of the fingers. Needle work uses only the small muscles. We picked out clay modeling. That is preferable to any other occupation, in cases where there is pain, stiffness and limited motion. The plastic yielding quality of the soft, slightly moist medium (clay) helps to reduce stiffness and increases motion. Clay modeling is especially recommended as an initial step and the outfit is very cheap. It can easily be adopted and adjusted as far as holding the chisel. The needle in needle work is fixed and tires out the muscles while the clay can be changed in different positions. We use Monolith. Typewriting can also be used.

(2) Wrist flexion and extension (for pronation and supination see elbow motion).
- (a) Clay modeling.
- (b) Knitting and ring knitting.
- (c) Block printing (especially good for extension).

(3) Elbow flexion, extension, pronation and supination.
- (a) Weaving a hand loom.
- (b) Making hooked rugs.
- (c) Knotting and netting.
- (d) Braiding strips for rugs.
- (e) Working on large pieces of needle work.
- (f) Carpentry—fret saw and hand carving.
- (g) Sand papering, decorating, painting, shellacking.

(4) Shoulder movements: Adduction, abduction, flexion, extension, rotation outward and rotation inward, adduction and abduction on the level of the shoulder, etc.
- (a) Most of those assigned to elbow and wrist.
- (b) Weaving on a large loom.
- (c) Carving.
- (d) Carpentry.

II—LOWER EXTREMITIES.

A. Foot: 1. Dorsal flexion.
  - (a) Sewing machine (foot power).
  - (b) Foot loom.
  - (c) Jig saw.

2. Plantar flexion.
  - (a) Sewing machine (foot power).
  - (b) Foot loom.
  - (c) Jig saw.

3. Inversion or abduction.
4. Eversion or abduction.

(At present we have no machines to suit these.)

B. Knee. 1. Flexion:
  - (a) Sewing machine.
  - (b) Foot loom.
  - (c) Jig saw (to a slight degree).

2. Extension—Potters' Wheel.

C. Hip. 1. Flexion:
  - (a) Foot loom.
  - (b) Jig saw (to a slight degree).

2. Extension—(a) Jig saw (to a slight degree).
3. Adduction—(a) Foot loom (particularly with 4 and 6 treadles).
4. Abduction—(a) Foot loom (particularly with 4 and 6 treadles).
5. Inward rotation.
6. Outward rotation.

ABUSE OF EXERCISES.

However, one must not allow the pendulum to swing too much to the other side, and, instead of prolonged rest previously prescribed and practised, use continuous vigorous and frequent exercises. It is a well known fact that repeated traumas will affect the type of deformities which will develop.

Swaim (12) expresses the symptoms of overuse as follows: "What are the symptoms and signs of overuse of a joint? They have pain, tenderness, swelling and stiffness; in other words, inflammation. The important signs are swelling and continued pain. A damaged joint will always be painful, tender and stiff after unaccustomed use, but it will not swell if not overused, and the pain will subside quickly with rest. Consequently, one of the best guides is lasting pain and swelling. Soreness and transitory pain is not a contraindication to use, but pain and aching lasting for several hours and not ceasing, with the stopping of work, show that inflammation had been produced and harm done."

It is a wise policy to see that the exercises should be given every day for about five or ten minutes and later on increased to longer periods and perhaps twice a day. Lessons in control are better given by occupation than by gymnastics or exercises.

CONCLUSIONS.

1. Exercises are of great help in improving joint conditions in acute infectious arthritis, though they do not cure the disease.

2. Total abstinence from work and leading an inactive life are dangerous and frequently a marked factor towards producing permanent crippling.

3. The patient must be out of bed as early as possible and encouraged in every way to use the joints, which otherwise become increasingly stiff.

4. As soon as the inflammation begins to subside, have the patient himself go through the normal range of motion of the joint.

5. By mobilization, the joints are kept supple, adhesions are prevented from forming and the elasticity and tone of the muscles are preserved and their wasting is minimized.

6. Occupational therapy is preferable to exercises, as it assures some interest of the patient.
7. Active exercises, especially occupational, should be begun very early, while redness and swelling still exist.
8. By using occupational therapy, the exercises will take some useful as well as interesting form.
9. Separate occupations can be chosen for the exercising of individual joints.
10. Lasting pain and swelling after exercises show that the joint has been overused and this should be guarded against.
11. The exercises of occupational therapy are only important adjuvants to the established treatments of infectious arthritis.

REPORTS OF CASES.

I will report a few interesting cases to illustrate certain phases of the effect of exercises:

CASE I.—H. M, a young man of twenty-seven, when he came under my observation in 1910 in Montefiore Hospital, with an acute attack involving all joints, a helpless invalid unable to use his hands even to feed himself. The attack came on a few weeks after his graduation from the College of the City of New York. Patient intended to study law and felt greatly grieved that he had to interrupt his studies. After making rounds of the different institutions for a year and a half, he came under my care.

Putting him under the treatments generally used, the inflammation subsided slightly and he began exercises in two weeks. Within three weeks he no longer had to be fed. He himself worked, using his joints and invented new exercises (at that time we knew nothing about occupational therapy), and improvements were marked. Within three months he was able to shave himself and within six months he left the hospital. He resumed his studies, and went through the law school and became a useful (?) attorney.

Comment.—The will power of this patient and the desire to follow his studies caused him to submit willingly to the pain, perform the exercises and correct the deformities.

REFUSAL TO DO EXERCISES.

CASE II.—S. F., female, aged twenty-nine, married, extremely neurotic, quarrelsome and cranky. Had influenza in 1918 and after that became supersensitive and exaggerated any pain she had. Complained of pain in the finger joints. I could not find marked arthritis but attributed the pain to the after effects of influenza. She had formerly been employed in a hospital for incurables, where she saw many arthritic cases. She thus considered, without any foundation, her arthritis incurable, though it was, a very mild case and a good prognosis could be expected. Baking and massage were prescribed, housework was also strongly advised, both to prevent deformities, hasten recovery and also on account of the extreme neurotic temperament. She, however, refused to do housework and even neglected her children and was busy all day with the baking and massage as is habitual with neurotic patients. She eventually, however, resorted to calisthenic exercises on the advice of her female friends, to reduce the corpulency induced by her sedentary life. I considered her too neurotic to be treated by an orthopedic surgeon and discharged her. A few years later I heard that, though her disease had not progressed, she still considered herself an arthritis case and led an inactive life which led to family hardship.

Comment.—This case demonstrates the unwillingness of some women to do exercises, even when the case is mild. Fortunately, the calisthenic exercises taken for beautifying purposes were the means for a beneficial end.

USE OF EXERCISES.

CASE III.—O. F., female, single, aged twenty-four. While a pupil nurse, fell and injured her left knee, was confined to bed a few days during which time she also suffered from a sore throat. The knee became swollen and painful. Had to give up her training and returned home on the advice of her physicians, to stay in bed for a few months. The knee did not improve. The swelling and pain increased and the patient could not put any weight on the knee. As she was very poor and had no one to take care of her, she was admitted to a home for incurables at the age of twenty-four. She was there for a year and a half. By accident she was seen there by one of the ladies of the social service department of Fordham Hospital, who felt somewhat touched by seeing such a young woman become a cripple. She therefore had her transferred to Fordham Hospital and placed her under my care. The examination showed a distinct infectious arthritis of the knee. The knee was placed in a plaster cast for ten days, then baking and massage started. The sight of the nurses in their uniforms aroused in the young woman the desire of again becoming a nurse and she finally picked up courage and asked me whether she would be able to go back to training. Though I hesitated to encourage her, I told her that she might be able to return in a year. She decided then to help the nurses to make beds, etc., while walking with a cane. She improved very rapidly so that within two months she was permitted to go part of the day without a cast while doing the ward work.

A dance given by the nurses was another stimulus to the young lady to increase her active exercises, and she no doubt reminded herself of the dances that she attended while a pupil nurse. Within three months she asked permission to leave the hospital to go to a convalescent home for two weeks. She asked me privately (with a flush in her cheeks) whether she could dance while there, which I gladly permitted.

She returned from there in better health and has made a perfect recovery in one month. She has now returned to the training school to continue her studies.

Comment.—The great desire to become independent has forced her to do active exercises and the ward work, which she was so anxious to do, caused her to perform all the necessary exercises without any complaint. The rapid recovery proves the great value of occupational therapy—housework being the therapy used in this case.

529 COURTLANDT AVENUE.

A bibliography will appear in the author's reprints.

Results of Exercise for the Correction of Postural Defects

By ROBERT JAY COOK, M.D.,
New Haven, Conn.,
Assistant Professor of Surgery, Yale Medical School.

The purpose of this paper is to call attention to the value of correcting postural defects, and to show by analytical tables just what can be accomplished by systematic exercises given under supervision.

The common postural defects found among men entering Yale are round shoulders, increased anteroposterior curvature as kyphosis or round back, lordosis or hollow back, scoliosis either postural or structural, flat chest, prominent abdomen, and weak feet which term includes the several types of foot strain and foot abnormalities.

Dr. L. T. Brown (1) worked a classification for the students of Harvard University which most institutions have followed. In his paper Dr. Brown classifies the postural defects found as a whole and gives them a single rating of A B C or D. This rating is a composite of their trunk and head posture combined with an evaluation of the function of their feet. It has seemed to the writer that this classification, i. e., combining trunk and feet with a single body rating was too complicated and that it would be more advantageous in considering posture if the classification should rest upon the defects of the trunk, and then classify the defects of the feet separately.

In a paper entitled a Report of the Orthopedic Examination of 1,393 Freshmen at Yale University, I called attention to the fact that but twenty-five per cent. of these men had a normal spinal curvature, that over fifty per cent. had some scoliosis, and that over fifty-five per cent. had an increased anteroposterior curvature. The chest was flat in fifty-six per cent. of cases and the abdomen was prominent beyond the normal in forty-two per cent. of men. Without an analysis of a large group of men it would be difficult to realize that poor posture is so common. This year with a total analysis of over 2,200 men we find that our statistics are practically the same. When it is considered that these defects are found in men who have just completed their high school or preparatory school we become impressed with its seriousness. Living in a period when the cry is for preventive medicine one wonders why we wait until the individual is developed before an attempt is made to correct defects of posture which yield to corrective therapy so much more readily in the child than in the adult. It seems certain that these defects are forming during both the graded school and high school life of the child, and if some corrective therapy were instituted in schools at this period the poor posture found so commonly among adults could be avoided. In other words, it would be desirable, in addition to the usual athletic sports of school life, to require instruction in corrective gymnastics in order to prevent the development of round shoulders, round back and the too common spinal curvature. The advantage of good posture lies not alone in appearance but in general health, general efficiency, and improved mental capacity. Whether the cause of the poor posture of the child lies in malnutrition, disease, overgrowth, or overwork he would benefit by being under trained supervision to assure the development of his body along lines which are generally recognized as normal.

The study of postural defects has been carried on for three years at Yale. During the first year we attempted to carry on the corrective work in the general gymnasium but the amount of work required in this type of corrective gymnastics proved too much and we found at the end of the year that but little had been accomplished in the correction of postural defects though the man had profited much by the exercise and in most cases had considerably strengthened himself. Following this trial we set aside a room in the gymnasium to be used only for the correction of postural defects and placed the work in charge of men qualified in corrective gymnastics. It is the study of these cases upon which this report is based.

It is interesting to note the posture of the men entering from the various types of preparatory schools. In general those entering from military academies lead, the boys from the private preparatory schools came next, although following the war when men entered who had been under military instruction in high schools the year or two previously they outrated the private preparatory school boy in bodily posture. Following these came the group entering from high school. Of course exceptions to the rule are found in all groups. The easier life of the boy who can afford to go to a private school as against the public school boy who often must work to defray part of his expenses may to some extent explain the difference. Upon talking with the boys from both private schools and public schools we find that only occasionally has effort been directed to overcoming their postural defects, and we think that it would be possible for both types of institutions to give more attention to the posture of their students.

For the past two years we have carried on our work by dividing the men into groups of ten or twelve, and have given the correctional work from Thanksgiving to Easter, a period of fifteen weeks. The men are stripped so that the body can be seen at all times, both by the instructor and by the man himself in the mirror. The general plan of the exercises has been to stretch out the contracted muscles, to obtain greater flexibility of the thorax and greater freedom of the shoulder girdle, and then to increase the tone of the trunk muscles. In some cases of scoliosis it was necessary to add asymmetrical exercises—in others it was necessary to use manual stretching especially in resistant cases of round back and round shoulders.

In the work of the past two years we have the complete records of over five hundred men and in the analysis of these I have grouped them according to postural defects.

It has been interesting to note that the man who had scoliosis combined with increase in the anteroposterior curvature improved both conditions even though his exercises were directed mainly at overcoming the major one. In fact, the man who corrected any defect usually corrected all in about the same proportion. Rarely did a case show no improvement.

The main reason for presenting this work is to show just what can be accomplished among school boys by corrective work, and to urge those who are interested in the field to check up their results since it is evident from a study of the tables presented herewith that many cases listed as partial correction could be completely corrected by a little more individual work, even though during the period of correction the improvement of the posture of the man seemed satisfactory.

TABLE I.—CORRECTIVE GYM.—ANTEROPOSTERIOR CURVES.

Correction	Complete		Partial			None		Increase	
KYPHOLORDOSIS—									
Deg	*Cases*	*Deg.*	*to Deg.*	*Cases*	*Deg.*	*Cases*	*Deg.*	*to Deg.*	*Cases*
1	44	2	1	77	1	46	0	2	3
2	17	3	2	18	2	34	1	2	3
3	5	3	1	18	3	5	2	3	1
		4	2	3					
	66			116		85			7
KYPHOSIS—									
1	32	2	1	4	3	2	1	2	2
2	19	3	2	1	2	23			
3	2	3	1	3	1	15			
	53			8		40			2

We have grouped the increase in the anteroposterior curve in groups numbered respectively 1, 2, 3, 4 according to the increase in the curvature, in the same manner we have grouped round shoulders, while the carrying of the neck and head forward has been grouped according to degree from the perpendicular. Scoliosis has been measured from the height of the apex of the curve to the base line drawn between the spinous process of the seventh cervical vertebra and the spine of the sacrum.

In Table I dealing with accentuation of the anteroposterior curvature of the spine we found that we had been able to correct completely sixty-six cases of kypholordosis and fifty-three cases of kyphosis, to correct partially 116 cases of kypholordosis and eight cases of kyphosis. There were eighty-five cases of kypholordosis and forty cases of kyphosis in which no correction was made and nine cases in which the defect became worse. It has been our experience that the correction of round back is the most difficult part of the problem in the correction of postural defects among this group of men. Among these students it is decidedly more resistant to corrective exercise than is round shoulders or postural scoliosis.

TABLE II—NECK FORWARD—MEASURED IN DEGREES FROM THE PERPENDICULAR.

Degrees	*to*	*Degrees*	*Cases*
		Complete Correction	
.5		0	88
10		0	82
15		0	40
20		0	2
			212
		Partial Correction.	
10		5	67
15		10	25
15		5	46
20		10	4
20		5	3
			145
		No Correction.	
20			1
15			7
10			27
5			38
			73
		Increase.	
0		5	4
0		10	2
10		15	1
15		20	1
			8

Our Table II deals with the carrying of the neck and head too far forward.

The correction of this defect has been quite satisfactory. In many cases it is associated with kyphosis or round back, the correction of which helps in the correction of the carrying angle of the neck. The carrying of the neck too far forward can be corrected without correcting the associated kyphosis in which case the kyphosis is concealed largely but we cannot too strongly urge that the correction of the round back should be attempted as well as the correction of the carrying angle of the neck when the two are coexistent. In this group we were able to correct completely 212 cases, to partially correct 145 cases, while seventy-three cases showed no improvement, and eight cases showed an increase in the carrying angle of the neck.

TABLE III.—ROUND SHOULDERS.

Degree	*to*	*Degree*	*Cases*
		Complete Correction.	
1		0	70
2		0	72
3		0	26
			168
		Partial Correction.	
2		1	109
3		2	30
3		1	49
4		3	1
			189
		No Correction.	
3			8
2			30
1			52
			90
		Increase.	
0		2	1
1		2	5
2		3	1
			7

TABLE IV.—POSTURAL SCOLIOSIS.

Apex of Curve.			*Cases*
		Correction Complete.	
1″			15
¾″			8
½″			35
¼″			43
			101
		Partial.	
1¼″	to	1″	2
1″		¼″	20
1″		½″	18
1″		¾″	8
¾″		¼″	11
¾″		½″	5
½″		¼″	30
			94
		No Correction.	
1″			8
¾″			1
½″			22
¼″			31
			62
		Increase in Curvature.	
0		¼″	5
0		½″	3
¼″		½″	7
¼″		¾″	1
¼″		1″	1
½″		¾″	3
1″		1½″	1
			21

Our results in the correction of round shoulders show that 168 cases were completely corrected, 189 were partially corrected, ninety cases showed no improvement, and seven showed an increase in the defect.

In part our failures seem traceable to the attitude of the student who does not always enter fully into the spirit of the work, and part may be due to pushing too rapidly the man who has outgrown his physical strength. In the latter case it is probable that his work should have been of a much lighter character.

Reviewing our cases of postural scoliosis we find 101 cases completely corrected, these cases varying from a quarter to one inch, ninety-four were partially corrected, sixty-two cases showed no correction, and twenty-one showed an increase of the curvature.

For a detailed study of the postural defects found in the freshmen at Yale I refer to my former article (2).

These defects of posture found among young men do not tend to disappear without corrective work but they can be overcome by such, some by the nature and severity of the defect requiring a longer period than others. Since they are formed long before the student enters college it is certain that much could be accomplished in the way of prevention, or, when found, in the way of correction if suitable supervision was given to the children of the grade and high schools or their equivalents the boys' school, the girls' school and the preparatory schools. The question is often raised as to whether this correction is permanent or temporary. We have reexamined in the past fall those men who were given correctional work the preceding year and in these cases we can say that the improvement has remained.

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Contracted Achilles Tendon*

By A. GOTTLIEB, M.D.,
Los Angeles, Cal.

Achilles tendon contracture as an entity is of rare occurrence but as a misnomer for a contracture of the calf group muscles it forms a condition with various symptoms and signs, which depend upon the underlying etiology and upon the loss in the range of dorsal flexion of the foot.

The normal range of ankle motion is between 70 to 80°, of which plantar flexion is 55 to 60° and dorsal flexion 15 to 20° from the right angled position. The loss of ability to actively and passively dorsiflex the foot to the given range is a condition which we encounter whenever the calf muscles are permanently contracted.

ETIOLOGY.

No age is exempt. It may occur intrauterine, either as a congenital deformity of inheritance or as a developmental defect after conception of a normal fetus has taken place; or it may develop postnatal, ninety-six per cent. of all cases do, from trauma, constitutional diseases, inflammations of the ankle joint, the calf muscles or the Achilles tendon and as a static compensatory contracture.

MODE OF DEVELOPMENT OF THE ACQUIRED TYPES.

1. An injury may cause a traumatic arthritis of the ankle joint with pain and rigidity. To guard against pain, the patient restricts dorsal flexion to a minimum; he rests the foot or walks, if able to, with the foot in plantar flexion. This position allows the origin and insertion of the muscles of the calf to be approached; they undergo shrinkage and contracture, while their opponents, the anterior leg muscles, lengthen and atrophy from disuse.

Injury may result in a fracture of the lower end of the tibia, fibula, or both, without or with joint involvement. If the latter occurs, we have a repetition of the above condition, only more severe, while in fracture without traumatic arthritis we may have to contend with a contracted calf because of the long continued immobilization in splints with the foot in right or obtuse angled position.

Tearing and contusing the muscles may occur in trauma and lead to contracture because passive stretching causes pain and is therefore not practised. Instead of that the leg is strapped or immobilized with the foot in plantar flexion to relieve the tension upon the torn tissues.

Here may be classed the wounds which result from gunshot, shrapnel, knives, deep burns, or other similar conditions. The skin, cellular tissue, muscles, and tendons may be involved in the process and the contractures which follow are in severity in direct proportion to the extent of the injury to the tissues and to the loss of their substance. The contractures are the sequence of the shrinkage of the fibrous scar.

2. As a secondary manifestation in a bedridden patient with a constitutional disease, the contracture may develop. The bed covers press upon and hold the feet in plantar position and if no preventive measures are taken against this damaging influence, the plantar position persists and becomes a permanent one.

Diseases which directly are likely to produce calf muscle contracture in virtue of their pathology are gout, chronic arthritides and other diseases commonly known by the misname chronic rheumatism.

The pathological changes which they produce are similar in character: the ankle joint becomes thickened, its movements restricted, its position-plantar flexion and its controlling muscles partly atrophied, the anterior group more that the posterior which undergoes compensatory shortening and contracts by taking up the slack in the muscles and tendons as it occurs in paralytic conditions to be described below.

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*Read before the Harbor Branch of the Los Angeles County Medical Society.

Under this heading may be classed the pathological affections of the central nervous system which leave the leg muscles into a spastic or paralytic state depending upon the effect produced, i. e., muscular spasticity or flaccidity. The contractures to follow are known as neurological contractures.

The spastic type is traced back to a direct irritation of the central nervous system and is characterized by an increased tonus of the calf muscles which, although allowing passive stretching, will snap back into their contracted position as soon as the force is released. Spasticity we find after various brain injuries and after brain lesions such as hydrocephalus, porencephalus, brain tumors, sclerosis, syphilis and meningeal and cerebral hemorrhages. Not only cerebral but certain affections of the spinal cord will lead to flexion contractures as well; these are: multiple and disseminated sclerosis, spastic spinal paralysis, syringomyelia and hysteria of long standing.

The paralytic form originates from the injury to the motor nerve apparatus either at the centre or at the periphery. Central paralyses are in most cases the result of spinal cord pathology; cerebral lesions very rarely produce flaccid paralysis. The cord lesions are: Compression myelitis, late stage of tabes dorsalis, spina bifida, progressive muscular atrophy, intoxications from lead and other chemical poisons, chronic spinal meningitis with destruction of the nerve roots, and, last but not least of all, poliomyelitis. In comparison with all the various causes, poliomyelitis overweighs them all in the production of the flaccid type of paralysis with the resulting calf muscle contracture.

The development of the paralytic contractures can be understood on the basis of the antagonistic mechanical theory of Seelenmüller, which, applied in this instance, reads as follows: In all cases of paralysis of the anterior muscle group, voluntary attempt of motion, as dictated by the brain, will result in the transmission of the impulse to the posterior group only, because its nerve conduction is not inhibited. Only the nonparalyzed antagonists will contract and place the foot in the corresponding plantar flexed position. In this position the foot must persist because the paralyzed muscles are unable to counteract the contracted antagonists. Every attempt at motion produces the same effect until these continuous muscular contractions leave the muscles in a lasting spastic contraction. Serious damage to the structure and function of the muscles results from this continuous spasm, eventually causing them to shrink and contract permanently. The mechanical element of this theory is the weight of the foot when walking or recumbent. The weight forces the foot into plantar flexion and augments the above named cause.

3. Acute and chronic inflammations of the ankle joint may lead to the defect in question. The acute arthritis may be caused by an infection through an open wound or the hemotogenous route in infectious diseases, like measles, scarlet fever, gonorrhea, typhoid fever, and others. The chronic, deforming and destructive, arthritides are principally of tuberculous or luetic origin.

Muscular inflammation of the calf group of remote or even unknown origin, besides trauma, comes under consideration. Short lasting myositidis will undergo resolution, while conditions of long standing will lead to degenerative changes within the muscle tissues, will produce disturbance of motion in the dorsal direction and finally lead to contracture of the calf. To these affections may be counted: myositis fibrosa, traumatic and infectious myositis and myositis ossificans.

The tendon Achilles is also susceptible to inflammations which may produce adhesions to the skin, tendon sheaths or to the tibia.

4. The habitual wearing of shoes with heels of at least two inches high produces in the wearer, among other anatomic readjustments, a compensatory contracture of the calf muscles. The foot is permanently held in plantar flexion within the shoe. The origin and insertion of the gastrocnemius and soleus are approached and the muscles thus relaxed. The slack which forms in the muscles will be taken up; they will shrink and contract permanently to an extent directly proportional to the height of the heel worn. This transformation will result into a socalled Schaffer's foot.

TREATMENT.

From the discussion of the etiology may be deduced that the acquired deformity can easily be prevented. Whatever the lesion of the lower extremity be, traumatic or inflammatory, local or remote in origin, the foot must be retained in dorsal flexion in the course of treatment in the acute stage. This pertains to long recumbency and to diseases of the nervous system as well. The Schaffer foot, however, can only be prevented by eliminating the stylish high heeled shoe of today. With these precautions and with the employment of prophylactic physiotherapy whenever indicated in the treatment of the acute condition, nearly all these acquired contractures of the calf muscles could be abolished.

The actual treatment of mild cases, similar to the Schaffer foot, lend themselves to cures by the conservative methods. This consists in the application of physical modalities which are able to produce superficial and deep local hyperemia and to effect a softening of the organized fibrous scar and contracted tissues. Such stimulating physical modalities are: convective heat and incandescent light and heat, for superficial hyperemia, and diathermy and the negative galvanic ionization for through and through heating and dissolving effects. These remedies are preparatory to massage, vibration, stretching and manipulations which follow. Besides these, active and passive exercises must be executed voluntarily by the patient. Among these the most efficient are:

1. The patient is standing at arm length from the wall. The arms are outstretched and touch the wall with the palms at about the height of the shoulders. The entire foot resting on the ground, the patient bends forward in the ankle joints only. Gradually the patient may place the feet further away from the wall, thus increasing the dorsal flexion of the foot when the body falls forward.

2. The patient is standing on the heels with the toes elevated on a wooden block. In this position the body bends forward in the ankle joints until stretching pull is felt in the calves.

3. The patient walks on the heels with the toes raised.

4. Dorsal flexion of the foot by forcibly pulling

each end of a tape placed under the metatarsus. The knee must be held extended in this passive stretching.

If high heels are worn, they must be lowered gradually, because a sudden change cannot be borne by any patient.

Conditions which do not yield to this conservative treatment or those in which it is obvious that nothing short of operation will overcome the deformity, operative procedures must be selected according to indications, i. e., to free adhesions, dissect away old scars, transplant muscles, elongate the tendons or forcibly stretch the shortened muscles under general anesthesia.

Whatever operation be performed, aftertreatment, physical, and mechanical, must be resorted to to guard against recurrence and to restore normal foot function.

605 Consolidated Realty Building.

The Diagnosis and Treatment of Minor Injuries to the Lumbar Spine and Sacroiliac Joints

By MORRIS B. COOPERMAN, M.D.,

Philadelphia, Pa.,

Instructor in Orthopedic Surgery, University of Pennsylvania Post-Graduate Medical School.

Minor injuries to the lower part of the back are of frequent occurrence. Many of them occur among the working class. An early diagnosis and the application of appropriate treatment are greatly to be desired to reduce the tremendous cost in money and wastage in time that a large percentage of these cases entail. From personal observation of a number of chronically injured backs, and from studies made by Sever, Wallace, Cofield and others, it appears that the period of incapacity from which these patients suffer is entirely too high. When patients are disabled from five to seventeen months on account of injury to the lower back, some of them of a minor nature, it is evident that either a proper diagnosis had not been made or the treatment had not been adequate.

I believe that the trouble lies in the haphazard method of grouping all these injuries into the category of sprains with no attempt at accurate or scientific diagnosis. In truth, no other part of the body has been the subject of so much unskilled and random diagnosis. The pathological condition manifestly present seldom seems to attract attention. As a matter of fact, many of these cases are exceedingly puzzling in their clinical manifestations. It is a fascinating study to trace an inadequately defined pain to its true source.

In a study of disturbances of the lumbar spine and sacroiliac joints, it has been customary to divide them into the following groups: static, toxic, and traumatic. It is with the latter group that we are most concerned. The traumatic group is further subdivided into acute and chronic types. The point must not be lost sight of, however, that a static or an arthritic back, being traumatized, will give rise to more serious symptoms than a normal back sustaining the same degree of trauma. Furthermore, there may be involvement of the spinal cord or large nerve trunks in this region which will produce a train of symptoms obscuring the injury to the spine itself. The anatomical peculiarities of this region must be remembered, because without a knowledge of the muscles, joints, and nerves, we will often be misled in interpreting what is actually present. It is also well to remember that there are wide variations in response to injury in different individuals. For instance, two men may be injured in a similar manner, viz., a slight twist of the spine. One will get well with little or no treatment, while the other has a long period of disability even with adequate treatment.

TYPES OF BACK INJURIES.

Depending upon the degree of violence, injuries to the back may be divided into the following groups:

Group 1.—Mild or trivial injuries. These are the contusions, strains of ligaments, muscles and aponeuroses and slight twists of the spine, resulting from blows directly upon the back, by falling objects, by lifting heavy objects or in falls from a height. The symptoms are local pain and some stiffness which may subside in the course of a few days.

Group 2.—Moderately severe injuries such as sprains, severe contusions, subluxation of vertebræ or sacroiliacs, fractures of spinous processes, transverse processes, or compression fractures of the bodies of the vertebræ without displacements and without cord involvement. The x ray is of paramount importance in diagnosing these cases. The symptoms are local pain and tenderness. Sometimes there will be swelling and discoloration. The muscles are rigid and joint movements are markedly limited.

Group 3.—Severe injuries to the spine. In these cases we have fractures or fracture dislocations of the vertebræ with cord involvement. As a rule their diagnosis offers no difficulty, because the symptoms point to serious lesions of the cord or nerves. In this type there may be the paraplegias, bladder and rectal symptoms. The x ray determines the extent of bone injury but neurological examination is essential to determine the degree of cord and nerve involvement. Spondylolisthesis may be considered in this group. It is a dislocation of the lumbosacral junction between the fourth and fifth lumbar vertebræ, whereby the lumbar vertebral column slides forward on the pelvic inlet. Injury may precipitate this condition. It is recognized by marked lumbar lordosis, diminution of the pelvic inclination and vertebral shortening of the trunk. On rectal or vaginal examination, there is a marked angularity between sacrum and lumbar vertebræ. An x ray examination clinches the diagnosis.

Group 4.—Injuries to those suffering from chronic spondylitis. In these cases a knowledge of the patient's previous condition is essential. Chronic spondylitis, hypertrophic osteoarthritis of the spine or chronic rheumatism of the back is a progressive disease, most common in men past middle life. Traumatism will, in many instances, aggravate the chronic inflammatory process in the vertebral joints. A slight blow upon the back or a fall associated with a twist of the spine or the lifting of heavy objects will set up a train of symptoms which may be quite severe. Chronicity seems to be characteristic of this disease. The back, naturally stiff and irritable, will become more irritable. Jars, walking on uneven surfaces, sudden movements or acts, such as coughing or sneezing, will produce pain, sharp and cutting in character, usually on one side of the lumbar spine, if the injury has been unilateral. Sometimes the sacroiliac joints are also involved and in such instances we have the referred pain down the back of the thigh and leg, viz., symptomatic sciatica. An examination will show flattening of the lumbar region, boarding or muscular rigidity and marked limitation of movement. The gluteal muscles may be atrophied and tonic spasm may be elicited in the hamstrings of the injured side. X ray examination will usually demonstrate lipping of the vertebral bodies, osteophytic outgrowth or bridging of the vertebræ or arthritic changes in the sacroiliacs.

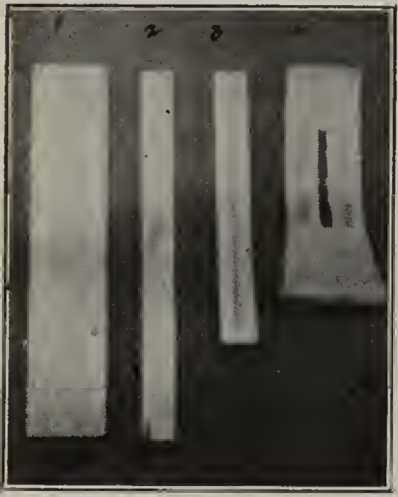

FIG. 1.—Splints. 1. Splint board as it is obtained from the surgical supply house. 2. Single strip cut from large piece. 3. Reinforced strip held together by adhesive already moulded. 4. Splint assembled.

Group 5.—Chronic traumatic spondylitis of the lumbar spine and traumatic flat backs. In the latter there is usually an associated osteoarthritis in either one or both sacroiliac joints. This differs from group 4 in that the patient was normal prior to the injury. In this group we must also consider that a tuberculous infection may follow traumatism. The history of the patient usually is as follows: Following a mild or moderately severe injury of the spine, they begin to suffer from pain, weakness, and stiffness. These symptoms gradually become worse and produce chronic invalidism. In some patients there develops a round kyphosis involving several vertebræ. This is a nontuberculous rarifying osteitis of the vertebral bodies first described by Kummell in 1895. The softening and collapse of the bodies give rise to deformities not unlike Pott's disease. In other cases a different clinical picture is observed.

The traumatic flat backs are brought about by chronic strain upon the lumbosacral articulation or unilateral sacroiliac joint strain. In these cases the lumbar spine has lost its anterior curve and the sacrum is rotated backward. The lumbar spine is flat and rigid. Usually there is a marked boarding of the muscles in the lumbar region and considerable hamstring spasm which may be unilateral. This group is representative of a fairly large number of cases in orthopedic practice.

Group 6.—The railway spine or litigation back. These patients usually endeavor to exaggerate the symptoms. In the absence of x ray evidence, or osteophytic outgrowths, tenderness, pain or stiffness in the region of the spine after an accident, which is unaccompanied by deterioration of health or confined to one spot, is usually psychic if complained of upon repeated examination.

TREATMENT.

In a consideration of the treatment of these injuries, it is well to classify the cases into those in which rest in bed is required, the ambulant case, requiring fixation either in the form of plaster of Paris jackets or other rigid apparatus, and those in which adhesive strapping or application of liniments, lotions and the like seem to be beneficial.

ACUTE INJURIES.

Posture.—In all moderately severe injuries to the lumbar spine or sacroiliac joints, the best results are obtained by putting the patient to bed for a variable period, until all signs of spinal irritation have subsided. The period of recumbency may be one, two or three weeks, depending upon the severity of the violence.

A proper position in bed in the treatment of these cases is of paramount importance. The treatment that is usually instituted is to put the patient to bed on his back with pillows under his head and shoulders. This, by flexing the back, puts the injured muscles or ligaments on a stretch, leaves them in the worst possible position for repair, increases the tendency to hemorrhage at the seat of injury, delays absorption of exudates and favors the formation of an excessive amount of fibrous tissue. When these patients finally leave their bed they frequently suffer from pain, stiffness and weakness due to causes mentioned above.

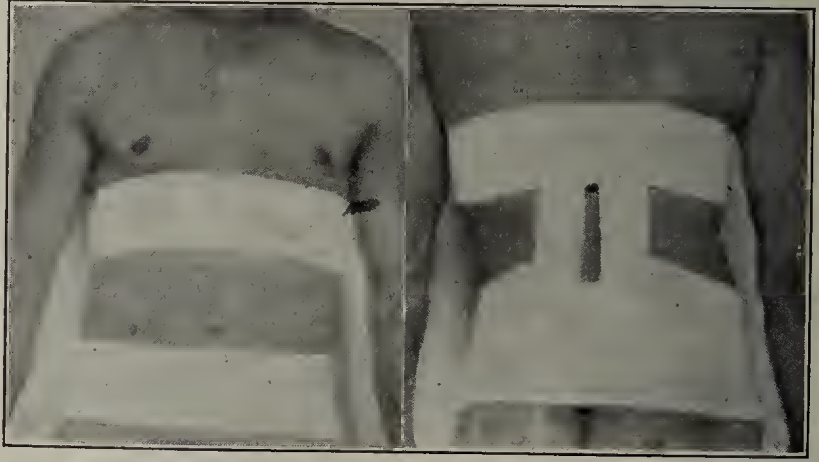

FIG. 2.—Splints applied. Anterior and posterior views.

The proper position is to put the patient supine either upon a Bradford frame or upon a firm nonsagging bed. A position difficult to enforce, but extremely desirable, is the prone position. In this posture the spine is the highest part of the body, and thus, passive congestion is prevented. Again, the absence of pressure is a great comfort when the back is unduly sensitive or tender. Furthermore, the spinal muscles attain their maximum relaxation when the body is prone. Finally this position allows for the ready application of local treatment to the injury such as light massage, baking, cupping and the like.

Plaster jackets.—After the patient is out of bed, the next problem is to know what to do with him. If the back still presents irritability, manifested by pain, stiffness and limitation of movement, it is advisable to apply some form of fixation. This may be in the form of a plaster of Paris jacket, a steel brace or a support usually employed by me made from wooden splints. If the plaster of Paris jacket is used, it should be removable; in other words, it should be cut down the middle. Massage, baking, and exercise are decidedly beneficial and should be employed at regular intervals during the period when fixation is being employed.

In the course of several weeks, the plaster of Paris jacket, or whatever form of fixation is used, can be dispensed with as the irritability of the spine subsides. Where osteoarthritic changes in the lumbar spine or sacroiliac joints are present, it is wiser to continue the use of spinal support for three or four months. These patients can go about their business quite comfortably. Under sufficient protection spasm subsides and motion returns to some degree. The joints are relieved of strain, adhesions, fibrositis, and secondary contractures lessen and sometimes disappear entirely.

Spondylitis is a progressive disease and at any stage fixation is the only efficient remedy.

Now we come to the patient whose injury is not severe enough to put him to bed and yet he requires some form of fixation to relieve strain at the site of injury. A light well fitting plaster of Paris jacket or a support made from wooden splints is used. These should be applied immediately after the injury is sustained and should be maintained for a week or two until all evidences of disability have disappeared. We can then employ physiotherapy. These patients, in the course of two or three weeks, are restored to normal function. The mistake is often made of treating these patients by means of adhesive plaster. It is obvious that adequate fixation cannot be obtained by strips of adhesive plaster applied to the back. In whatever fashion we apply it, its splinting effect is not sufficient.

Wooden splints.—I have used supports made of moulded wooden splints with considerable success in lieu of adhesive plaster, during the past year, in a number of injuries. These splints are applied to the lumbar spine and maintained in position by strips of adhesive plaster encircling the pelvis and lower thorax. They can be made by any surgeon from material at hand. The ordinary splint boards are cut into strips an inch and a half wide and from ten to twelve inches long (Fig. 1). For a muscular individual, four strips are used. They are immersed in water to soften them and are then moulded to conform to the shape of the lower back. After drying the shape is retained. Two strips are fastened together by means of adhesive plaster along their borders. These reinforced strips are then joined at the upper and lower ends, a space being left sufficiently wide to clear the spinous processes. Pads of felt, cotton, wool or any other soft material are then applied to the surfaces where pressure is to be exerted. Three strips of adhesive plaster three inches wide and of sufficient length to encircle the pelvis keep the splint in position. The upper end is kept in position by one or two strips two inches wide, which encircle the lower thoracic wall. To prevent irritation, the abdomen should be shaved. Cutting into the groin by the anterior strip is prevented by putting a layer of absorbent cotton or lint beneath the adhesive plaster along the lower margin (Figs. 2 and 3). Over this a muslin bandage is applied which finishes the dressing. The patients wear this support for a week. If the back is still irritable it is reapplied and worn for a longer period.

ADVANTAGES OF BACK SUPPORT.

In my experience this back support is a practical, ambulatory dressing. It is simple in construction, gives considerable comfort to the patient and provides adequate rest to the part without being cumbersome. It is particularly efficacious in sprains of the sacroiliac joints because the tight girdle of adhesive plaster offers a great degree of security to the part, the wooden uprights restraining the action of the erector spinæ muscle upon the pelvis.

Adhesive strapping. — Adhesive strapping is a popular method of treating many back injuries. Properly applied in the selected case it is of value, but used indiscriminately in all injuries it has been the cause of a great number of cripples. The indications for the use of adhesive strapping are the following: slight twists of the spine in which some of the spinal ligaments have been stretched, strains of muscular fibres, strains at tendonous insertions; in other words, any injury in which the symptomatology is of mild degree.

We should have a definite idea in mind as to what is expected to be accomplished by these strips of adhesive plaster. The prime object is to secure relaxation of the structures injured and fixation for a short period of time, and they are therefore applied along the muscle reaching from origin to insertion, and in this manner their splinting effect attains the maximum effect.

TECHNIC.

The manner of applying these strips of adhesive plaster is as follows: For example, in a strain of some of the fibres of the erector spinæ muscle three or four strips two inches wide and long enough to reach from the thoracic wall posteriorly to the crest of the ilium are applied on each side of the spinous processes. The tendonous expansion of this muscle upon the ilium and sacrum are fixed by several strips of adhesive two inches wide and long enough to encircle the pelvis. The application of adhesive plaster in this fashion restrains muscular activity, fixing the muscles which have their origin from the posterior surface of the ilium (the glutei).

USE OF GIRDLE.

In my experience the addition of the girdle of adhesive to the usual method of strapping makes it far more efficacious and of greater comfort to the patient. After four or five days the straps may have become loosened. They should be removed and the back thoroughly massaged. If there is still local pain and tenderness on motion, the straps should be reapplied and kept on for several days longer. Usually in these minor injuries, at the end of ten days or two weeks these patients have fully recovered.

CHRONIC BACK SPRAINS.

In the treatment of chronic back sprains or traumatic flat back, two methods are available.

FIRST METHOD.

First, rest in bed in a supine position upon a Bradford frame for from two to four weeks, with continuous traction applied to the extremities. By this means the irritability of the spine subsides, because strain and weight bearing have been removed. Muscular contractures are sometimes successfully overcome and joint surfaces separated. Through the application of physiotherapeutic measures, such as baking, cupping, massage, and manipulation, the restoration of function and relief of symptoms are established. It is wise, in these chronic cases, after the patient has risen from bed, to have him wear a spine brace or a plaster of Paris jacket for a month or two, so as to maintain the relaxation and fixation of the parts. The patient can get around very comfortably under such circumstances.

SECOND METHOD.

The second method of treating these traumatized backs is to rapidly and forcibly overcome the contractures and adhesions by manipulation under anesthesia. This treatment has been successfully employed by Wallace and Fiske with remarkably good results. The patient lies supine upon a strong table and first one extended leg, then the other, is forceably flexed upon the abdomen. By these manipulations the spine is flexed to the superlative degree. The ilium rotates backward upon the sacrum, the extended leg being used as a lever. Thus the normal lumbar curve is restored. A considerable amount of force is necessary and must be used, because we frequently encounter marked unilateral hamstring contractions.

This work is considered well done when we are able to flex the extended leg to an angle of about 90 degrees with the trunk. Wallace states that he has been able to flex the extended limb beyond this angle, and in some instances has been able to bring the foot almost up to the clavicle. In our experience these manipulations have not resulted so remarkably. Wallace also states that he has heard a distinct click which he attributes to the reduction of a chronically displaced sacrum. When we are satisfied that the posterior muscles and ligaments have been thoroughly stretched a plaster of Paris jacket should be applied, reaching from the lower scapula angle down to and including the pelvis. In cases of sacroiliac joint disturbances a long plaster of Paris spica, reaching from the waist line to the toes, should be applied. This plaster apparatus is worn for several weeks, after which a light spine brace, providing support to the lumbar spine and sacroiliac joints, should be worn for two or three months. The patient receives physiotherapy and back exercises several times a week. At the end of several months the back becomes quiet and the patient is symptomatically cured. As a matter of record an x ray examination should be made to determine the condition of the affected region.

TUBERCULOUS SPINE. TRAUMATIC SPONDYLITIS.

Tuberculosis of the lumbar spine or sacroiliac joints and traumatic spondylitis are treated either conservatively by means of apparatus or by operation. The conservative treatment of these cases consists in the prolonged use of a spine brace, until all evidence of the disease has disappeared. These patients, therefore, must be under observation for a number of years, during which time they must be given the benefit of the recognized régime for the tuberculous.

Fixation by means of the Albee bone graft seems to offer a quicker method of curing this disease, as in the case of the adult workingman. Even in the presence of sinuses, the disease has been arrested. aspiration is far safer than incision, even if it has to be repeated a number of times. Calot's modifying fluid is injected after the tuberculous material has been aspirated. A nontuberculous spondylitis of traumatic origin can be rapidly cured by the Albee method of bone grafting.

CHRONIC SPONDYLITIS.

The problem of a spondylitic back or chronic arthritis of the spine sustaining an injury requires careful consideration. These patients must not be treated lightly. We should institute adequate protection by means of apparatus, at the same time we should clear up all foci of infection that may be present.

CONCLUSIONS.

1. Minor injuries to the lower back are of frequent occurrence, many of them leading to prolonged disability. Inaccurate diagnosis and inadequate treatment account for the chronic disturbances of the back.

2. Injuries to the lumbar spine are grouped into the following classes: a, mild injuries such as contusions, strains of muscle fibres or ligaments; b, moderately severe sprains, fractures of vertebral processes without displacement and without cord involvement; c, injuries to the spine with cord and nerve injury; 4, injuries resulting in traumatic spondylitis or tuberculosis in patients normal prior to the injury; e, injuries to those suffering from preexisting chronic osteoarthritis, and f, hysterical spine or litigation back.

3. The most severe acute injuries to the back are treated by a variable period of rest in bed and by apparatus, namely, plaster of Paris jackets, wooden splints or steel braces.

4. Adhesive strapping should only be reserved for those cases manifesting a mild symptomatology.

5. Chronic sprains of the back are treated conservatively by preliminary traction of the spine upon a Bradford frame, followed by the use of a plaster of Paris jacket or brace and physiotherapy. The operative treatment consists of manipulation under anesthesia, to overcome adhesions and contractures and to restore the posteriorly dislocated sacrum to its anterior position, this to be followed by immobilization in apparatus and physiotherapy later.

6. Traumatic spondylitis and tuberculosis of the lumbar spine are treated either by apparatus for a long period of time or by operation (bone graft).

2017 Pine Street.

Suppurative Arthritis

By HARRY COHEN, M.D.,
New York.
Attending Surgeon, People's Hospital.

In this report only five cases of suppurative joints are cited. From a clinical point of view I appreciate that the number is far too small to be of real scientific value. However, when one considers that these cases are relatively infrequent and since the results in the newer method of treating these cases are almost uniformly good, I feel that the report of even so small a number will be of value in stimulating further interest in this subject. The good results in these cases are all due to the Willems method of treatment. In an article (1) that I wrote over a year ago, the method was fully described. In that article sixteen cases of all kinds of joint lesions were cited, but only one of a suppurative joint. Since then I have had five more and as remarked above the almost universally good results obtained warrant their reporting. To begin with the Willems treatment consists of early active mobilization of the involved joint after free incision. No drain is inserted into the joint. The usual results of this form of treatment are complete drainage of the joints, apyrexia throughout the entire treatment, limitation of the infection to the synovial membrane and the elimination of the postoperative atrophy. In suppurative joints I can see no contraindication to the use of the Willems treatment. When it is considered with what dread all surgeons used to approach these cases and the bad results that usually followed the treatment, the most common being either a high mortality, amputations or poor functional results especially ankylosis, it can be seen to what extent we are indebted to Willems.

CASE REPORTS.

Case I.—Suppurative arthritis of the right knee joint. H. H., aged seven, referred by Dr. M. Isenberg. This case was previously reported in the article published a year ago. However, it will bear repetition here. Admitted to the People's Hospital, July 26, 1920. Twenty-three days before admission he fell on a broken bottle, the glass penetrating the right knee joint. The knee gradually increased in size and symptoms of severe knee inflammation, including high temperature developed. On examination there were all the evidences of acute inflammation and fluid in the joint. In addition a healed wound was visible along the outer border of the patella. Röntgenograms showed the joint distended with fluid. An incision was made over the old cut and on entering the knee joint a large amount of thick yellowish pus was evacuated. The joint was washed out with Dakin's solution and immediate active mobilization was commenced. He was permitted to leave the bed on the fourth day, and encouraged to walk and climb stairs. The result was a complete cure in three weeks.

Case II.—Suppurative arthritis of left knee. R. B., aged twenty-one, referred by Dr. I. Jacobowitz, admitted to the People's Hospital December 3, 1921. History of three weeks' duration with pain, tenderness, swelling of the left knee; with septic temperature ranging around 104° F.; knee excruciatingly painful on any motion. Urethral and vaginal smears for gonococci were negative. The knee was aspirated and a large amount of thick greenish pus obtained. A bilateral incision, one on each side of the patella, was made and Willems treatment instituted. An immediate result was the dropping of the temperature to normal and a general improvement in her appearance. Before operation her condition was so severe that a fatal result was anticipated. She left the hospital in about four weeks with fifty per cent. mobility in the joint. The apparently poor result in this case, especially when compared to the others, we blamed partly on the patient as she was very much averse to carrying out the Willems treatment and only did so when severely urged.

Case III.—Suppurative arthritis of left wrist. S. S., aged ten months, referred by Dr. J. Abowitz and Dr. H. N. Appel, June 26, 1922. The patient had been sick one month, suffering at first with lobar pneumonia, then with measles, and then again with double pneumonia and finally with left cervical adenitis. At the suggestion of Dr. Appel I incised and drained the cervical abscess which healed in a few days. On July 1st the child developed a suppurative arthritis of the left wrist. Blood culture was negative. X ray showed the joint distended with fluid and on July 3rd I incised the wrist joint and evacuated a considerable amount of pus. Culture showed a staphylococcus. A rubber tissue drain was inserted to but not into the joint. Active and passive motion was instituted and a complete cure resulted in two weeks. The functional result was normal.

Case IV.—Suppurative arthritis of right ankle, complicating diabetes and erysipelas of leg. S. W., aged forty-five, referred by Dr. J. Weiss, May 15, 1922. The diabetes in this case had been under control for a long time. The sugar in the urine ranging from one half per cent to sugar free. Patient suffered several attacks of erysipelas, but this time suppuration developed in the right ankle joint. Incision under procaine with evacuation of the pus. Drainage to joint. Willems treatment with complete cure in two weeks.

Case V.—Suppurative arthritis of second joint of right ring finger. S. B., aged fifteen, referred by Dr. H. Goldstein, was admitted to the People's Hospital, August 21, 1922. Finger infected three weeks ago by the stick of a pin. Finger incised on four different occasions, by local physicians, but joint instead of improving swelled to more than twice the normal size. X ray showed joint distended with fluid and necrosis of articular surfaces with beginning osteomyelitis. The condition of the joint was so bad that amputation of finger was advised by a prominent surgeon because he believed that at best a stiff joint would result, and consequently the finger would always be in the way. However, free incision with evacuation of the pus and then Willems treatment resulted in a perfect cure in four weeks.

CASE VI.—Gonarthrosis of right wrist. S. B., aged twenty-eight, referred by Dr. A. Saiken, August 23, 1921. This case, although not a suppurative arthritis, represents an allied condition, and is therefore included in this report. There was a history of Neisser infection of three weeks' duration. The patient had been receiving active treatment with the result that the local infection had almost cleared up. About three days before I saw him there developed a typical gonarthrosis of the right wrist. The joint was markedly distended, red and excruciatingly tender as gonorrheal joints usually are. I applied a plaster of paris cast to the joint and kept it on for one week. After removing the cast the Willems treatment was applied and in another ten days he was entirely cured. It used to take me as long as two months to cure similar cases by other methods of treatment of which there were very many.

CONCLUSION.

In conclusion, in Willems treatment the results in suppurative joints have been more gratifying and that we can give to patients so suffering a fairly good prognosis.

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221 SECOND AVENUE.

One Hundred Cases of Weak Feet in the Adult With Pedographic Findings

By JACOB GROSSMAN, M.D.,
New York.

Chief of the Orthopedic Clinic, Stuyvesant Polyclinic; Chief of Orthopedic Clinic and Junior Adjutant Orthopedic Surgeon to Lebanon Hospital.

Although the recording of the impressions of feet in diagnosing abnormal conditions is not new, still the majority of orthopedists have not adopted this procedure. It is with the hope of having this method more universally used that this paper is written. Heretofore, a diagnosis was made upon the findings of an impression of the foot and a few objective signs and symptoms. No accurate record of the exact status of the foot at the initial visit was kept. The maintaining of such a record is important, for with it subsequent records or findings can be compared. In this way we have at our disposal an accurate method of determining the effects of our therapy. It also places at our disposal a permanent tangible record.

In recording the findings of a given case of weak feet, it is necessary to consider several points. First among these is the distance of the keystone of the bony longitudinal arch, i. e., the scaphoid, below a given line. This line is known as the Feiss line and is found by connecting the posterior border of the internal malleolus with the plantar surface of the first metatarsophalangeal joint. In the normal foot the scaphoid is usually one half inch below this line. As a rule in weak feet, it is usually more, varying from three quarters of an inch to one inch.

The second point to consider is the quality of the muscles of the plantar surface of the foot. Usually in weak feet the muscles are found to be poorly developed. In recording the condition of the muscles the terms good, fair, and poor should be used. This is important because a heavy, well developed group of muscles may give a flat impression, which flat impression may represent an apparent flat foot, the bony arch and the other findings being normal.

The third point to be sought for is the presence or absence of the juvenile fat pad. Here again the fat pad may give a flat impression in spite of the fact that the foot is otherwise normal.

The fourth point to be determined is the presence of eversion of the heel and heel cords. This should be recorded as slight, moderate, or well marked, as the case may be.

Finally the impression of the foot, or pedograph, should be taken. The pedograph varies and should be recorded as first degree weak foot, second degree weak foot, and third degree weak foot. The details of determining the degree of weak foot and the method of taking the pedograph follow. The patient is seated, the leg is extended and the bare foot is painted with an iron solution. The foot is then hastily placed on paper and the patient is told to place all the body weight on that foot. At this point the contour line is drawn by using a pencil held at right angles to the plane surface. This contour line demonstrates the amount of inversion of the ankle or eversion of the heels and heel cords. The foot is then removed from the paper, leaving a yellowish imprint. A solution of tannic acid is now applied to the iron imprint which turns a jet black, giving a record which can be preserved indefinitely.

The base lines and the auxiliary lines are now drawn on the pedograph for estimation of the degree of deformity. The first base line is drawn from a point posterior to the internal maleolus to the first metatarsophalangeal joint. The contour line extending beyond this line represents the degree of inversion of the ankle or eversion of the heels and heel cords. The line of axis weight bearing is next drawn, from the centre of the heel to a point midway between the first and second toes. A line is next drawn at right angles to the line of axis weight bearing from a point posterior to the heel. Another line is drawn also at right angles to the line of axis weight bearing, from the first metatarsophalangeal joint. Midway between the last two lines, also at right angles to the line of axis weight bearing, is drawn the line of estimation. The line of estimation is then checked. One check is placed at the outer border of the imprint, the other check being placed at the junction of the line of estimation and the first base line, or if valgus is present, at the junction of the line of estimation and the contour line. Midway between the two check marks on the line of estimation is the normal point, that is, the point where the inner border of the imprint meets the line of estimation in a normal foot. To the inner side of this point the line is divided into three parts representing the degrees of weak foot. The first check mark represents one degree, the second, second degree, and the third, third degree weak foot.

This procedure has been followed in one hundred cases of weak foot with the following findings.

The age of the youngest patient was fourteen years and the age of the oldest was seventy. There were thirty-two cases in males and sixty-eight in females. Most of the cases ranged between the ages of twenty and thirty. There were thirty-eight in this age limit. There were twenty-one cases between the ages of thirty-one and forty, fifteen between forty-one and fifty, twelve between fourteen and twenty, eleven between fifty-one and sixty, and three between sixty-one and seventy.

The occupations were as follows: Housewives, 59; clerks, 8; operators, 6; students, 5; salesmen, 4; cutters, 3; bookkeepers, 3; waiters, 2; policeman, 1; letter carrier 1; cook, 1; janitress, 1; barber, 1; tailor, 1; machinist, 1; peddler, 1; school teacher, 1; bartender, 1.

The majority of the cases occurred among housewives. The cause undoubtedly was the conventional shoes which the majority of these women wore, aggravated by the fact that they were obliged to do a greal deal of standing. Eversion of the heels and heel cords was present in all the cases. It varied from a slightly noticeable to a very well marked degree. In the normal foot the heels and heel cord are usually parallel to or converge slightly towards the midline of the body. In weak feet just the opposite is the case. The heels and heel cords diverge from this midpoint.

The juvenile fat pad was present in two cases. In these cases the feet made a flatter impression than they ordinarily would. This must be remembered when examining a case. The fat pad should always be sought for. In some instances the bony arch may be absolutely normal as demonstrated by other findings and still one obtains a second or third degree pedograph of weak foot. This is only an apparent weak foot pedograph and is the result of the fat pad.

The muscular development of the sole of the foot was poor in seven cases, good in three and fair in ninety. It is well to remember that a bulging, well developed muscular layer in the sole of the foot may also produce a weak foot pedograph, just as a fat pad would. One is not justified in making a diagnosis of weak foot in such an instance unless the remainder of the findings warrants it. Hence it is important, especially where the remainder of the findings is normal, to note whether the muscular layer is a bulging, well developed one.

The subjective symptoms in this series varied. In twenty-one they were unilateral and in seventy-nine they were bilateral. Forty-three of the patients complained of pain in the legs and calves, thirty-nine referred their pain to the feet, five complained of pain in the thighs, and four to the knees. One patient complained of a limp, five complained of turning their ankles easily, and four of them said that they tired very easily and could not walk as much as they desired.

The distance of the scaphoid below the Feiss line varied from three quarters of an inch to one inch. With some exceptions, the further the scaphoid was below the Feiss line, the more marked the weak foot appeared on the pedograph. In the cases in which the pedographs were normal and the other evidence leaned toward a diagnosis of weak feet, the scaphoid and the soft tissues were not depressed sufficiently to produce a change in the pedograph. These cases were usually early cases.

The pedograph was unilaterally normal in four cases and bilaterally in ten cases. It was abnormal unilaterally in four cases and bilaterally in eighty-six. Of the unilateral cases, one was a one degree weak foot and three were two degree flat feet. Of the bilateral, six were one degree weak feet, fifty-nine were second degree and twenty-one were third degree.

It is important to again emphasize that all these factors should be considered before attempting to make a diagnosis of weak feet. They should all be considered together and then only should conclusions be drawn from the findings.

CONCLUSIONS.

1. In arriving at a diagnosis of weak feet one should always take in consideration all diagnostic means at one's disposal. It is not sufficient to note whether there is eversion of the heels and heel cords or a flattening of the arch.

2. By means of the pedograph, the determination of the level of the scaphoid, the presence or absence of the juvenile fat pad, by consideration of the quality of the muscles of the soles of the feet and noting the degree of eversion of the heels and heel cords, one can record fairly accurately the status of a foot condition.

3. While this method is not infallible, yet in it we undoubtedly have the foundation upon which we can accurately study successive changes in the foot.

4. Poorly fitting, conventional shoes produce the majority of acquired foot deformities.

5. Preventive measures will in a large number of instances obviate permanent crippling and suffering. Good orthopedic shoes will usually accomplish this.

6. In my experience it was noted that a great number of weak feet met with in the adult could be traced back to childhood. In a paper (1) recently published I noted the findings of the value of pedographs in recording and diagnosing abnormal foot conditions in children. Were the method as outlined in this paper to be followed, it is a certainty that the majority of weak feet found in adult life would be less often encountered.

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Editorial Articles

THOR.

A heroic figure, known among certain groups, is Boris Sidis. It is true that he is not thoroughly appreciated for his innate modesty and ultraconservatism have kept him hidden from the gaze of the vulgar public.

He may be pictured as the popular concept of the God of the Old Testament—fearless, virile, just. It can be foreseen how certain critics, in their spleen, will be prompted to call him cruel and vindictive. Others may go so far as to call him cowardly, but this should not be tolerated for these accusations may be refuted by quotations from his own *Nervous Ills,* which is a book published by Badger in Boston. To anticipate his critics, we will take up the defense of this great man. To prove his fearlessness, we examine his attitude on psychoanalysis. Of course it requires courage to combat a thing like psychoanalysis. A list of the leading neuropsychiatrists who subscribe to this pernicious doctrine includes such men as Bianchi of Italy, Varendonck fo Belgium, Jelgersma, Kappers of Holland, Bleuler of Zurich, Delgado-Valdizau of Peru, Stoddart and Jones of England, White, Jelliffe, Kempf, and a host of others in this and other countries throughout the world. What evil *dæmon* could have taken possession of these otherwise reputable men? There should be a senatorial investigation! But let us not get into a passion over the matter but listen attentively to the words of our Jahovian oracle. "Many take up psychoanalysis as a sort of mental masturbation which in the long run is sure to play havoc with their nerves and mind. Freudian psychoanalysis should be openly declared a fraud. Psychoanalysis is a sort of mormonism. Psychoanalysis is a sex religion. The psychoanalyst with his allegories, symbolism, sublimation, incest, phantasies, bisexuality, sexual suppression, mother complexes, œdipus and electra phantasms, and all the other complex psychoanalytical instrumentalities is an excellent example of sex obsessed, delusional dementia præcox."

Not only does he come right out and give a minute critique of psychoanalytical theories but he presents a diagnosis of the psychotic ailment of the psychoanalysts. This should answer the question of his courage. Others may contend that psychoanalysts suffer from paranoia, cyclothymia, or other psychoses, but we are inclined to agree with Sidis—dementia præcox. Perhaps another time he will go more fully into the description and tell us, who are breathlessly awaiting the word, what particular form of precox the analysts suffer from, catatonia, hebephrenia; most likely it is a complex paranoid form with very early moral and physical deterioration.

Sidis ascribes all nervous ills to *"selfpreservation and the fear instinct."* He sums up in various places, *"Functional psychosis or neurosis is an obsession, conscious and subconscious, of the fear instinct." "Neurosis is a disease of selfpreservation and fear." " . . . selfpreservation and fear are at the bottom of the psychopathic neurotic constitution."* No doubt the reader understands all this and finds himself in accord, but we must first answer those bothersome critics. First among them will be those who insist on finding a cause for the fear. Among them will be those who say one cannot fear unless there is doubt. Where fear is there hatred is also. Fear cannot be present without impotence. It is necessary to find out the origin of these more primary causative factors before we can deal intelligently with the fear manifestations. Why bother to answer these quibblers who are continually taking the joy out of life with their everlastiing searching for what they call truth. Is it not enough that an eminent man like Sidis says "fear?" Enough.

Then they will say: "How can one have an obsession of an instinct?" We will not even deign to answer. Sidis has probably selected his words unfortunately. He no doubt was thinking of weightier matters when he wrote this. They will then no doubt want to know what gibberish is meant by "*a disease of selfpreservation.*" Why can't a man have any disease he chooses? There are diseases of the appendix or mind—why not of selfpreservation, esthetics, or calisthenics? One must have a soul to appreciate Sidis's epigrammatic utterances, and who ever heard of a psychoanalyst with a soul.

Let us now briefly consider Sidis in some of his noble constructive phases. His attitude towards his patients may be inferred from the following rather touching description:

". . . 'tigress,' 'satan,' 'fiend,' would be more appropriate appellations. She was a firebrand from hell, a firebrand fanned by the furies of self and fear." In another instance she is described as "a regular vampire, sucking the life blood of her family. The woman was obese as a hippopotamus, well nourished, with a florid complexion, and with an appetite that would shame a Gargantua." We can hear the critis harping, "Sidis shows his affective state in his ridicule and hatelike descriptions of his patients. A scientist who was not emotionally swayed would not use terms such as these in talking of unfortunate neurotics who came to him for understanding and aid. A physician cannot understand his patients or psychological processes when he allows his affective state to stand between him and his patients. They may even have the temerity to add that this exhibition of hate implies impotence and revenge. But we will not heed these trouble makers. Surely Sidis can call his patients anything he pleases. It just shows his bravery and he probably did not apply these terms, that may be considered a bit harsh to them, to their faces. At any rate one may be sure that he does not discuss sexual things with them for right in his introduction he definitely shows his attitude toward this nastyminded procedure.

There may be those among the critics of the great Sidis who say his book is more of an autobiography revealing his hatred, impotence and the great phobia he has of psychoanalysis. They may even be foolish enough to say he has harped on his pet "fear" theory to the point of making himself ridiculous and causing the whole book to have a distinct paranoid trend. We shall not even discuss the matter with those who are lowminded enough to suggest such evil thoughts.

What better answer can we give to all the critics of Sidis than his own words: "I kept on treating her by the hypnoidal state." This should silence them all.

THE PROGRESS OF MEDICAL JOURNALISM DURING THE PAST ONE HUNDRED YEARS.

The progress of medical science in all its branches during the past one hundred years has exceeded that of any previous period of the same length. This is to say that more important discoveries have been made, side by side with greater advances in clinical medicine and surgery. Pasteur whose centenary has just been celebrated, revolutionized the practice of medicine by the results of his investigations into germ life, and helped to render it a more or less exact science. Without the aid of medical journalism progress might have been much slower. Intelligent, shrewd and sane journalism is a potent force for spreading knowledge and for forming opinion.

The *Lancet,* which at the close of this year will have been in existence for one hundred years, has been a pioneer in this direction. It may thus be classed as fittingly representing medical journalism. Established in 1823 by Thomas Wakley, one of the most fearless of reformers, it has played a part in the introduction of most of the reforms which have taken place in the British medical profession and in all things appertaining to medicine and health in Great Britain since its foundation. Its journalistic activities have not been confined to the country of its birth, but by publishing news of medical interest it has fulfilled the original and ambitious intention of its founders to notice medical affairs in England "or in any part of the civilized continent."

The *Lancet* supplies an excellent illustration in point of the strides made by medical journalism. In the first number issued on October 1, 1823, clinical notes from three widely separated towns were published, an earnest of the avowed intention of giving news from far off places. Its centenary year opens in the number of January, '23, in which are published communications from London, the British medical centers, Edinburgh, Vienna, Tokyo, Paris, New York, Philadelphia, Cape Town, Stockholm, Zurich, Madras, Bukharest and Berlin. The *Lancet,* then has symbolized adequately throughout its existence mainly on account of its age, but also because of its able editorial conduct, the advance of medical journalism during the past 100 years. While moving with the time it is more conservative than American medical journals. However, this is in keeping with the manners, customs and tastes of their respective readers. A study of the *Lancet* from its earliest days provides an engrossing retrospect of the ups and downs of medical science and its practitioners during the period covered, and the progress of medicine towards the light. At the same time, it exhibits the advance of medical journalism or rather is a mirror of its advance in all civilized countries.

THE COMPLICATIONS OF FRACTURES OF THE ASTRAGALUS.

Fractures of the astragalus are serious only from the viewpoint of function; in most cases the fracture is a closed one and does not require any surgical intervention for saving either the limb or the patient's life. Nevertheless, in some cases, quite rare for that matter, the fracture has been a compound one and deaths have been reported, for example in Barral's case in which a transverse buttonhole wound of the instep, with quite clean cut borders, allowed the escape of the head of the astragalus; death from infection occurred one week later. Other cases, especially those of Thierry and Blum, concern compound fractures, but the patients recovered.

Briefly stated, in some very exceptional cases the fracture may be compound and in the past the prognosis was most serious because it meant amputation —and death. At present infection can be controlled and prevented by early and thorough cleansing, or by primary astragalectomy undertaken at once.

The solutions of continuity of the integuments produced the exaggerated projection of either the external malleolus or the astragalus. At other times the fragment of astragalus dislocated either forward or backward, menaces the skin, gangrene sets in and transforms a fracture primarily closed into a compound one which has the same prognosis and the same treatment.

However, in two reported cases, death took place in simple fracture of the astragalus. In the first, reported by Pinnaté, the patient fell from the second story of a building and died twenty-four hours later, after presenting signs of pronounced syncope. At autopsy the capillaries and arterioles of the lungs were found distended and gorged with fat globules to such an extent that in the lungs it was impossible to find any spot not filled with fat. Therefore, a fat embolus was evidently the cause of death. In another case reported by Ménissez, death occurred from septicemia one week after the accident. There was a comminuted fracture of the astragalus without any lesion of the integuments. The bone was reduced into many fragments.

Briefly speaking, with the exception of some rare cases of early and rapid death, and in which the violence of the shock was far more important than the fracture of the astragalus itself, these fractures, like all other joint fractures, are serious only when they are compound. And even in these circumstances, the gravity, which is due to infection, can be eliminated or controlled by doing an astragalectomy without awaiting the onset of septic symptoms.

The prognosis *quoad vitam* of these fractures is consequently not serious in the majority of cases. The same cannot, however, be said of the function prognosis, and these fractures, often unrecognized or badly treated, as happens occasionally, result in tardy complications, the first of which is ankylosis. According to the lapse of time since the fracture this ankylosis will be both osseous and fibrous. The changes in the shape of the fractured bone and the displacement of the fragments on the one hand, and on the other the changes in the joint cartilages, fibrous bands and osteophytic productions, are the lesions creating ankyloses in bad positions.

But deformities of the bone or certain of its undisplaced parts also play a part in the production of ankylosis. In a case reported by Delore there was a fracture of the neck with flattening of the pully and this crushing had resulted in widening of the astragalus transversally. The pully broadened in the same direction therefore hit against the malleoli between which it remained with difficulty. There was also an elongation in the anteroposterior direction, especially behind, which explained the sensation of bony resistance which could be perceived behind the tibia.

In some instances the bone deformity constitutes the principal obstacle to movement. In one case (Albertin) the astragalus was packed together in such a way that the neck disappeared from fusion of the head with the body of the bone. Many similar cases could be quoted. Displacement of one of the two fragments, more or less deformed and adherent will also create functional disturbances. In Herbert's case the displaced posterior fragment, dislocated backwards and outwards, was adherent to the surrounding structures and had to be removed by morcellation.

The treatment of comminuted fractures of the astragalus requires total astragalectomy at once and this operation is the method of choice in cases of old fracture. The results of this operation may be said to be excellent so that, at present, with the aid of radiography and the judicious selection of the treatments at our command the prognosis can be generally regarded as good.

AUGUSTAN AGE OF SCIENCE.

The past one hundred years may, perhaps not inaptly, be termed the Augustan age of science, including, of course, medical science. It is extraordinary to think that a century ago nothing was known of microorganisms and their relation to disease. The science of bacteriology is comparatively new. Pasteur, the French chemist, was the father of bacteriology and taught that the long held belief that living organisms arose spontaneously was wrong, and that such organisms were never created but grew from others. Moreover, he showed that particular forms of germs were the causes of putrefaction. This discovery gave Lister the idea of antisepsis which he applied in 1866. By this method of treating wounds it was practically demonstrated that, when the microscopic living causes of decomposition were kept away from wounds, such hospital fevers as pyemia and gangrene, which had previously exacted a fearful toll in life and suffering, vanished at the same time. Pasteur, undoubtedly the greatest man of his time, and one of the greatest of all time, discovered the minute organism associated with puerperal fever and it was upon the firm foundation of the researches of this modest French investigator that Lister based his methods for preventing septic disasters. Of course this mode of treatment, in conjunction with the discovery of anesthetics in 1844, revolutionized surgery, robbed it of its chief terrors, and opened up an immensely increased range of surgical operations.

Parasitology is of even more recent growth than bacteriology and is yet in its adolescence. Its discovery is as momentous, perhaps even more so, than that of bacteriology. Laveran, another brilliant Frenchman, in 1880, suggested that malarial fever was caused by minute animal parasites, and he and Koch pointed out the possibility of mosquitoes being the hosts of the germs. Sir Patrick Manson carried the suggestion considerably further, but it was left for the Scotchman, Roland Ross, in India, to confirm the matter by an extended series of experiments. The American, Walter Reed, and others working in the same direction, found that yellow fever was carried and transmitted to man by a certain species of mosquito, and, acting upon these discoveries, the Panama Canal was made possible by the destruction of the breeding places of the mosquitoes. Many pest holes of tropical climates, in former times almost uninhabitable by white men, at least for any length of time, on account of malaria and yellow fever, have become comparatively healthful places of residence for the Caucasian race.

Again, plague is an insect borne disease. This fact was proved in 1894 by the Japanese scientists, Yersin and Kitasato, who showed that it was caused by an exceedingly minute vegetable parasite conveyed by fleas from rats to men.

Sleeping sickness was shown to be conveyed by the tsetse fly. American investigators showed that typhus fever was carried and transmitted to man by lice, and that various other diseases, were similarly transmitted by other insects. As said before, parasitology is a new science, but knowledge of it is progressing rapidly. It is only when the causative organisms have been discovered and the carrying agents are known that really efficient preventive measures can be employed.

Another recent medical discovery is that the internal secretions play an important part in the harmonious working of the human machine. A good deal is known of the thyroid gland, less of the pituitary body, and less still of the suprarenal, while knowledge of the other glands is yet somewhat vague though continually increasing. It is believed by some that endocrinology will be the medical science of the future and that when a really accurate knowledge of the ductless glands has been gained, a long step forward will have been taken. However, organotherapy has already achieved a considerable degree of success which, as further advances are made in that branch of medical science, will undoubtedly increase. In the human body disorders of a single organism will disturb the working of the entire mechanism.

The vitamine question is one that has bulked large of late. These extremely minute and somewhat elusive substances are as essential to nutrition and good health as perhaps are the proteins, fats, carbohydrates and mineral salts. However, it is difficult to adjudge the exact position each of these substances holds in maintaining the nutrition and, consequently, the health of the body. Beriberi is a deficiency disease caused by the consumption of polished rice, vitamines necessary to nutrition having been removed in the process of milling and polishing. There are other socalled deficiency diseases, although rickets, once thought to belong in this category, is now the subject of much argument. Some think that the vitamine theory has been somewhat overdone and, while the presence of vitamines is important, believe that the factor of greatest moment is a well balanced diet. The mineral salts are of the first importance and if they are lacking or deficient, especially the calcium salts, disagreeable or even serious results will follow. Mineral salts are present in the husks of grain, but by modern process of milling, both vitamines and mineral salts are removed. Metabolism is kept up to its proper standard by a diet which contains in due proportions all the food elements which go to make up a well balanced diet, one which is adapted to the climate, to conditions of work, and to the individual.

However, the discovery of the internal secretions and their importance in the human economy is valuable as, in a lesser degree, is the discovery of the vitamines and their use. Synthetic chemistry has done a good deal for medicine and it may be said with emphasis that the progress of medical chemistry during the foregoing century has been remarkable. It has been predicted by some who have the right to speak with authority that in chemistry the human race may find salvation, that is, from the point of view of health. The past one hundred years has been the Augustan age of science in which medical science has played its part.

WASHINGTON AND LINCOLN.

That good physique and health do not necessarily go together is abundantly illustrated by the lives of our two greatest Americans.

Both Washington and Lincoln were of large build. The former, according to the letter which he wrote when ordering a suit of clothes from his London tailor, was "six feet high and proportionately made—if anything rather slender than thick for a person of that height." The "best weight of his best days" was 220 pounds. Lincoln was four inches taller and weighed about 180 pounds, was of narrower chest and less erect. Both lived, in youth, much the same out of door life—Lincoln having the ruder existence. Both were very muscular, being the champions of sport in their respective days and localities. Both were robust in mental qualities as in physical strength and endurance. Yet when it came to resistance to bacterial infection, the contrast was as remarkable as was the comparison in other respects.

Washington, at sixteen, had malaria "to an extremity." While in the Barbadoes with his brother who was suffering from consumption, he contracted smallpox, which scarred him for the rest of his days. Soon after returning from the Barbadoes he was taken with "violent pleurisy" which reduced him "very low" and which is said to have caused the deformity of his chest. Again, in the Braddock campaign, he suffered from malaria, and in 1757 was obliged to leave his command and return home on account of dysentery. He had fever for four months, and, believing that he had become a victim of consumption, looked forward to "approaching decay." Three years later he was again ill with malaria. He had several attacks of "influenza," and in one of these, during his presidency, his life was despaired of. For nearly six weeks he was unable to transact business. Again after leaving office he suffered from malaria. His latest illness was quinsy contracted from exposure to cold and wet. Washington suffered also from inflamed gums and carious teeth, and by the age of sixty-three he had lost all these troublesome organs.

In contrast, Lincoln is said never to have been sick, although he would have been considered, at a glance, of inferior physique.

It may be of interest in this time of threatened return of smallpox that, when this disease attacked the Continental Army, Washington endeavored to have the Assembly of Virginia repeal its law against inoculation for this disease. He also urged his wife to secure protection against the disease by this means.

Both Washington and Lincoln were temperate in all things. Both, but especially Washington, led the out of door life, but neither fine physique nor temperance can take the place of bactericidal properties, inherent or acquired, in the tissues, when it comes to dealing with invading microbic armies.

VITAMINES.

A great deal of activity has been aroused by the publicity which has been given the subject of vitamines. As in every similar situation, many loose statements and assertions have been made. Various vitamine products have been put on the market both for the public and for physicians. Those which are designed to meet the requirements of the neurotic who purchases any new popular product in order to gain an open sesame to that golden state known as perfect health we shall not consider. For these blind purchasers are as willing to be duped by one preparation as another and it little matters whether they are given cobwebs or eel's feet.

The physician—that is, most physicians—want a reliable product that they may learn of its activities and so be able to judge what results are being effected. There are conditions in which it would seem reasonable to suppose that a dependable vitamine product would be a valuable aid. Just how valuable we may not be able to assert at present. At any rate, we must know the potency and reliability of the product we are using.

To this end a series of experiments were conducted by the Connecticut Agricultural Experiment Station at New Haven, Conn. They experimented with a number of vitamine products which are on the market and published the results of their findings in their Twenty-seventh Report on Food Products and Fifteenth Report on Drug Products (Bulletin 240, August, 1922). This piece of research work was most carefully done and the bulletin may be procured on request without cost.

It would seem advisable for all physicians interested in the vitamine question to examine this short report so as to understand better the potency of the products which they may use.

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Obituary.

DR. JOHN H. LARKIN, M. D.,

of New York.

Dr. John H. Larkin, assistant professor of pathology at Columbia University School of Medicine, died on Wednesday, January 17th, of pneumonia. Dr. Larkin was born in New York fifty-three years ago. He joined the staff of the College of Physicians and Surgeons immediately after his graduation from that institution in 1894. He had already been graduated from Manhattan College in 1891. He contributed many articles on his speciality and related subjects to medical journals and scientific publications, and had collected many valuable specimens for laboratory and research work. In the position of chief coroner's physician of New York city, which he held for several years, he took a prominent part in several notable criminal cases. Since 1911 he had been director of the pathological laboratory of the City Hospital. He was also professor of pathology at the Flower Medical School and consulting pathologist to six New York hospitals. He was a member of many medical societies, including the New York Academy of Medicine and the New York Pathological Society. He is survived by his son, John H. Larkin, Jr., who is studying medicine at Columbia. Dr. Larkin was one of the leaders in his special branch of medicine and his death is a real loss to the profession.

HERBERT EDWIN BARIGHT, M. D.,

of Saratoga Springs, N. Y.

Dr. Herbert Edwin Baright was born on January 3, 1868, at Poughkeepsie, N. Y. He was graduated from Cornell University, obtaining the degree of B. S., in 1889, and obtained his degree of M. D. at Ann Arbor Medical College in 1893. After that he was physician to the Hudson River State Hospital for four years and then to the Clifton Springs Sanatorium for seven years. He studied medicine in Vienna in 1911 and studied and traveled in Europe in 1906 and 1907. While in New York he was associated with Dr. Ludwig Kast from 1911 to 1915 and was instructor in the Post-Graduate Hospital Medical College. He was a member of the American Medical Association and a fellow of the New York Academy of Medicine. In 1915 he established the Saratoga Springs Sanatorium, where he practised until his health failed. He married Irene Benham in 1907. His mother, Dr. Julia Baright, is a physician living in Florida.

Dr. Baright's kindliness of disposition and gracious personality were of great assistance in his skilful handling of patients. His sanatorium was well known for its excellent management and for the individual care given to patients. This could only have been accomplished by the infinite pains and personal care of the doctor and his wife who survives him. The close attention to his patients and unswerving interest in diagnosis and treatment gave Dr. Baright little time for recreation, a fact which undoubtedly shortened his life. His interest in medicine was exceeded only by his own natural modesty.

HERBERT EDWIN BARIGHT, M. D.

The example of his great and unselfish service to humanity represented the ideals of a great physician and will be of lasting value to the medical profession.

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News Items.

American Laryngological Association.—The American Laryngological Association will meet at the Hotel Ambassador, Atlantic City, May 16, 17, and 18, 1923, under the presidency of Dr. Emil Mayer, of New York City. Dr. George M. Coates, of Philadelphia, is secretary.

New $500,000 Hospital for Jamaica.—The cornerstone of the new $500,000 hospital for Jamaica was laid on Van Wyck Avenue, Brooklyn, on December 7th. William C. Reid, president of the Jamaica Hospital, delivered a short address in which he praised the untiring efforts of those who made the new hospital possible. Mr. Reid placed the stone, assisted by Miss Mary R. Gale.

Annual Meeting.—At the recent Council meeting it was decided to hold the annual meeting of the American Gynecological Society in Hot Springs, Va., May 21, 22, and 23, 1923.

Physiotherapy Course.—A course in physiotherapy for the training of aides offers to women a thorough training in the science and practice of physiotherapy. The work will be given at the Walter Reed General Hospital, Washington, D. C., beginning February 27, 1923, and will cover a period of four months.

Eyesight Conservation.—The Eyesight Conservation Council of America has issued Bulletin No. 2 which presents a program for Eyesight Conservation Day in the public schools. The Bulletin outlines a procedure suitable for large and small schools for the examination of the eyes of all school children. The Council furnishes a vision chart for schools and in addition to the program for Eyesight Conservation Days in Schools has published folders in story form emphasizing the care of the eyes. Data may be secured from the Council whose headquarters are at the Times Building, New York City.

Dr. Michel Sails.—Dr. Leo L. Michel, genitourinary surgeon to the Hospital for Joint Diseases, New York City, has sailed for an extensive tour of the hospitals and institutions of England, France, Germany, Austria, and Italy. He will review the recent work of his specialty, as well as the new researches of Voronoff and Steinach. The new building of the Hospital for Joint Diseases (in the course of construction) will benefit from this trip as Dr. Michel will be on the alert to convey impressions for improvement in apparatus and technic.

Japanese Medical Commission to Visit the United States.—A recent cable dispatch from Tokyo announces the appointment of Baron Yoshihiro Takagi, chief surgeon and professor of surgery in the Tokyo Charity Hospital and Medical College, as a member of a commission of six Japanese doctors who will arrive in the United States early in March as guests of the Rockefeller Foundation for the purpose of studying American and Canadian medical institutions and methods.

The commission was appointed by the Japanese Minister of Education, Dr. Eikichi Kamada, to whom the Foundation's invitation was extended by President Vincent through Baron Shidehara, the Japanese Ambassador at Washington. Nominations for membership in the commission were made by the Japanese Committee for Graduate Medical Education in the United States, headed by Baron Sakatani, under whose auspices a number of Japanese physicians have pursued postgraduate studies in the United States.

THE FIFTH AVENUE HOSPITAL.

The Fifth Avenue Hospital is the result of the consolidation of the old Hahnemann Hospital and the Laura Franklin Free Hospital for Children. For several years before the war the trustees and medical staff of the Hahnemann Hospital had been considering replacing the old building, which had served the public for more than fifty years, with a new structure, so planned that the "ideal type of hospital service might be available to all persons, irrespective of class, creed or color." Investigation showed that the really poor are provided for in the city hospitals, and in privately endowed institutions. Persons of unlimited means may avail themselves of all the advantages and luxuries to be purchased in modern hospitals. But a large middle class exists, consisting of people of limited means who do not wish nor need to be charity patients, yet who are not able to afford the privacy and care that they would like to have. "To provide this in between class with all of the necessary comforts and the privacy of a single room is the great ideal around which this hospital has been constructed," says the present director, Dr. Wiley E. Woodbury, "but, in order that all classes may be accommodated, ample provisions have been made to care for persons of unlimited means as well as for those who are extremely poor. The rates authorized by the board of trustees are from nothing up."

A most imposing and impressive structure the Fifth Avenue Hospital is, occupying a whole block front on Fifth Avenue between 105th and 106th Streets just across from the Central Park Horticultural Gardens. The architecture might be described as an adaptation, to a modern skyscraper type of building, of North Italian Renaissance lines and a Spanish Mission roof. The building is nine stories high, with a central dome containing three more stories, and with a basement and subbasement. It is constructed in the form of an x, since this plan provides each of its three hundred rooms with outside lighting and exposure. This character of the rooms, and the fact that each patient has a private room, except on the children's floor, are the special and outstanding features of the hospital. Another feature is the doing away, as far as is compatible with medical standards, of everything suggestive of a hospital atmosphere. This has been done with notable success in the patients' rooms, which are exceedingly attractive with their pretty wooden furniture, painted in the most modern style, comfortable chairs, harmonious rugs, and, in some instances, a beautiful outlook over the park. Each room has a connecting lavatory, some have bathrooms, and others are in the form of suites. The walls are a soft French gray, and even the beds are enamelled to harmonize with the walls and furniture. On practically every floor there are waiting rooms for visitors, and these, too, are comfortable and attractive. Even the anesthetizing rooms of the operating department on the eighth floor masque their purpose in their decoration and furnishing, which resemble that of small parlors. The corridor walls are buff and tan, and further variety is added to the color scheme by having some of the rooms, among them the patients' solarium on the tenth floor, done in a soft grayish green. The nurses' rest room on the ninth floor is a large, sunny apartment overlooking Fifth Avenue and Central Park. Every floor has a loggia overlooking the park where patients or staff may sit or walk in the open air, in case they are not able, or do not wish to take advantage of the four promenade roofs on the tenth floor. Here on the roof the patient may remain all day yet receive as usual his regular meals and treatment.

FIFTH AVENUE HOSPITAL.

The first floor of the hospital contains the offices of administration, dining rooms for the resident staff and nurses, living quarters for interns, and private suites for physicians who wish to take advantage of the facilities of the hospital. These consist of a reception room, an office, and an examining room, and are so situated that patients may be admitted by a private entrance. The social service department has its headquarters on this floor. The chief function of this department is the investigation of nonpaying cases before they are admitted to hospital.

The second floor, called the Laura Franklin-Delano Foundation, is devoted exclusively to the care and treatment of children. On this floor, instead of single rooms, are large, many windowed apartments, some of which have been divided by glass partitions into isolation cubicles. Here also are playrooms, both indoor and out, a school room, a dental office, and other facilities. Outpatient clinics are held here daily from two to three.

The third, fourth and fifth floors, consisting chiefly of patient's private rooms, show the x plan which is one of the features of the Fifth Avenue Hospital. The four corridors, on which these rooms open, radiate from a court in the central rotunda. Around this court are the entrances to the elevators, and opposite them are the open supervisor's office, commanding a view of the elevators, the visitors' waiting room, and the whole length of the four corridors; adjoining the supervisor's office a small service room for the preparing of special treatments; back of this a rest room for special nurses; and behind the elevators two completely equipped treatment rooms. The fourth floor contains rooms for the supervisor's and the pupil nurses, and the third those for employees.

The sixth floor is devoted to maternity cases, with provisions for maternity clinics on Tuesdays and Thursdays. Here prospective mothers may be received and given two weeks' board, care and treatment, including delivery and treatment of the baby, all for the sum of $75. This floor accommodates thirty-eight adults and forty-five babies. There are three delivery rooms, one of which is especially equipped for the care of infected cases. The rooms on this floor have been provided with sound proof walls and ceilings, so that all noise has been reduced to a negligible quantity.

The seventh floor is much the same as the third, fourth and fifth, except that the rooms here are somewhat larger, several of them have private baths, and a number are arranged in suites to be thrown together when necessary.

The eighth floor is devoted wholly to the various scientific departments. The operating rooms are seven in number and occupy the northeast wing. These include a clinic operating room, two private operating rooms, an operating room specially equipped for genitourinary cases, with a cystoscopic room nearby, a plaster room for the orthopedic service, and special operating rooms for the eye, ear, nose and throat departments. There are also surgeons' scrub-up rooms, supplied with all the latest scientific apparatus to insure sanitation and asepsis, sterilizing units for the operating rooms, and a special instrument and supply room with the necessary articles continuously available for every type of operation. Each operating room is equipped with a recessed cabinet in the wall for dressings and supplies.

In the operating rooms the color scheme of gray is carried out in the dark gray tiling and very pale gray upper walls and ceilings, giving practically the same light effects as white. The furniture is also light gray. Regular operating hours are daily from eight a. m. until four p. m., but emergency cases are received at all hours. On this floor a reference library for the staff will occupy the space used on the other floors for the visitors' waiting room, and there is also a staff room for medical instruction and demonstration.

The southwest wing of the eighth floor contains the pathological and bacteriological laboratories. This department is equipped with a dumbwaiter service for the transportation of specimens direct from the other floors. In the southeast wing are the gastroenterology and x ray departments, with full equipment; and in the northwest wing are rooms for special treatment and examination, with a basal metabolism apparatus, an electrocardiograph and other equipment. On this floor also, as has been said, are the anesthetizing rooms.

The ninth floor is given over to the use of the nurses; the tenth has the open air roofs, the patients' solarium, and the quarters for the animals used in experimental research in the hospital; on the eleventh is installed the automatic dial telephone, and on the twelfth the great plant of the ventilating system.

There are also a basement and subbasement. In the latter are located the morgue, the autopsy rooms, the disinfecting and the incinerating plants, the fan rooms and the boiler plant. The main basement contains one of the special features of the Fifth Avenue Hospital, namely, the central service department. This is situated in the centre of the basement, adjacent to the linen room, surgical supply department, pharmacy, store rooms, general kitchen and diet kitchen. Four electric dumbwaiters and a freight elevator transport necessary articles from this department to the various floors of the building.

Orders for these necessaries are transmitted to the basement direct from the various floors by means of a telautograph in the supervisor's offices and automatic telephones. The general kitchen and the diet kitchen prepare the food, which is placed on trays that are immediately transferred to large, electrically heated, dumbwaiters, and so carried up to the various floors. When the meal is finished, the trays are returned to the basement. The other chief department of the main basement is that of the surgical supplies. This division has the complete handling of the sterilizing of the hospital.

As the Fifth Avenue Hospital has been receiving patients since last July only, it is perhaps too early to comment on the practical working out of its departures from ordinary hospital construction, equipment and administration. Inquiries as to whether a lack of skylights and the gray wall coloring in the operating rooms might not obscure the lighting to some extent, were answered by the statement that the large, complex and specially constructed electric lights directly over the tables obviate this possible criticism. Whether or not patients may be cared for as successfully in private rooms without special nurses as in wards remains to be proved by the Fifth Avenue Hospital system. According to this system the patient, when he wishes attention of any kind, presses a button in his room, which turns on a green light in the corridor above his door, and another in the supervisor's office. These lights stay on until the nurse goes to the patient's room and puts them out by pressing another button. If the patient is considered too sick to be left alone for part of the time, he is required to have a special nurse. All delirious patients, patients recovering from the effects of anesthetics, and, of course, critical cases of all kinds are also required to have special nurses.

There are various other minor points, the working out of which will be watched by New York nurses and physicians. Members of the staff report that to date the system as a whole has worked most satisfactorily, with minor modifications, as methods are being tried out. The administration is most cordial in its welcome of those interested in its plans and problems, thus enhancing, in contrast to an institutional or hospital atmosphere, the more cheerful and informal feeling given by pleasant, homelike surroundings, which have been proved not only possible but practicable, even in an institution so huge and so highly systematized as the Fifth Avenue Hospital.

VIENNA LETTER.

(From our own correspondent.)

Vienna, *December* 10, 1922.

AROUND THE SICKBED OF THE GERMAN PEOPLE.

The German medical world is making preparation for great demonstrations with which they intend to direct the attention of the world to the bodily degeneration of the German people in consequence of their economic misery. The medical faculties of all the universities, medical organizations, and the representatives of Germany are sending out a proclamation to the world pointing to the unbearable conditions and accentuating the necessity of checking the threatening economic collapse in order to save the only treasure of the German people, their good health. The existing economic conditions in Germany will destroy the health of the people and with this their capacity for work. The proclamation also announces a meeting on December 15th in Berlin University where the most eminent members of the medical world will present a picture of German distress. At this meeting several German physicians will speak on the subject of the sickbed of the German people.

THE CLASHING OF ECONOMIC AND SANITARY REGULATIONS.

The Board of Sanitation of Vienna has resolved to forbid automobile riding on Sunday in the environment of Vienna and to submit this resolution also to the provincial Prefecture of Lower Austria for the issuance of a similar order. The board was induced to do this by reason of the fact that automobiles caused such clouds of dust that the enjoyment of fresh air and sunlight were entirely impossible for children and foot passenger excursionists whose only recreation was coming to the suburbs. The organization of the Austrian automobile dealers has protested against this, arguing that it is not the proper way to make the air dust proof but is the proper way to ruin entirely the so nearly moribund Austrian automobile industry. The City Council of Vienna is called upon to solve a difficult problem.

PROSTITUTION IN VIENNA.

The City Council of Vienna publishes interesting statistical data relating to the spread of prostitution in Vienna. According to these data prostitution under control forms only an unimportant part of secret prostitution. While at the end of 1921 there were 1,438 secret prostitutes in Vienna in the course of this year the number of those caught on the street and in public bars amounted to 6,741 and even these represented only a small fraction of secret prostitutes evading control. The number of those under control decreased in proportion to that of prewar times. In 1913 the number of prostitutes in Vienna under police control was 1,879. Seventy per cent. of these were between eighteen and twenty-five years of age; 232 were over forty, fifty-seven were over fifty, and two were over sixty years of age. As to former occupation forty per cent. of the prostitutes had been domestic servants, thirty-six per cent. working women, thirteen per cent. waitresses and public bar cashiers. It is worthy of mentioning that the majority of working women had been only auxiliary laborers. Qualified working women represented only three per cent. It is noteworthy and characteristic of the social life of Vienna that in 1913 453 novices were registered at the police office; in 1914, 337; in 1915, only 78, and during the war this number decreased 48, while the distress after the war increased the number of novices to 538 in 1919 and in 1921 277 applied for "booklets" among those being 189 Viennese and 18 foreigners.

LENGTHENING OF HUMAN LIFE.

Dr. Paasch, secret counsellor in Berlin, has addressed an earnest warning to all German youths and their parents. He advises every family to compile its family tree, comprising all its members, and indicating what diseases each member suffers from. From this information Dr. Paasch wishes to be able to state, in cases of couples about to be married, whether or not healthy offspring can be expected. According to his opinion it is possible to lengthen human life but only through generations, and only then if healthy parents are engendering healthy offspring. He recommends children as well as parents to be careful in their manner of living. They should not overstrain themselves either bodily or mentally, should take care of their nutrition and clothing, and an adequate equilibrium between physical and mental work should be established. They should beware of sexual diseases and control their passions. They should take a sufficient amount of sleep because the most important requirement in long life was conserving the vital forces. However, all these factors came to expression only in the second and third generations and at that time very noticeable.

ADVERTISING THE NAMES OF DRUNKEN MEN.

The community council at Graz, Austria, has issued an order that the police shall compile a weekly list of those who have been arrested for drunkenness, this list to be printed and pasted on all poster columns. The first list appeared last week. The majority of culprits were industrial workmen, grocers, lower officials, laborers, and a few night watchmen. This radical measure will evidently decrease the drunkenness in the beautiful capital of Styria, which in season is crowded with English and American visitors.

COMPULSORY MARRIAGE IN ANGORA.

There is a measure before the Turkish National Parliament of Angora which in all probability will become a law. This proposed law provides that every Turkish youth eighteen years of age is allowed to marry and those who fail to marry before their twenty-fifth year can be compelled by state power to do so. The law does not show any mercy and if the party to be married is ill he will have to undergo a very rigid medical examination. If anybody is found fit for marriage, and despite this is not inclined to marry, he is regarded as a deserter and loses his passive electoral rights, cannot any longer fill a public official position and cannot even become an official of a private enterprise. If he has some annuities one quarter of these go to the state. According to these rules in the Angora republic single blessedness will become a luxury of the wealthy. The proposed law also protects the holiness of marriage. If the husband wishes to travel without his wife he has to get permission from the magistrate. If his journey lasts a long time he has to marry a second time and the wife obtained on the way has to be taken home. But not only a long journey entitles a man to more than one wife. According to this proposed law husbands who are fifty years of age, if their financial position permits, are obliged to marry another wife, otherwise they have to maintain young orphans. There is only one excuse for delaying marriage: students are absolved from marriage until the termination of their studies. It is easy to prophesy that in Angora there will be a good many students who will not make haste to finish their careers, and students of thirty-five and forty years of age will not be rare occurrences.

A PSYCHOANALYTICAL HOSPITAL IN VIENNA.

The first psychoanalytical hospital has just been opened in Vienna. Its chief object is to heal neurotic patients among the poorer classes and at the same time to give practical instruction to medical students and doctors in psychoanalysis. A similar institute was established three years ago in Berlin, to the entire satisfaction of the patients seeking aid, and it also has awakened the interest of medical men in the subject of psychoanalysis.

THE SALARY MOVEMENT OF THE VIENNA INSURANCE DOCTORS.

The Vienna insurance doctors were compelled to continue their strike on account of the disgracefully low salary they received from the insurance offices. The strike ended with their full victory. The unity of the doctors has been imposing. Workmen and laborers were unanimously supporting the doctors' interests.

CONDITIONS IN RUSSIA.

According to reports coming from authoritative sources there were 119,932 cases of typhus exanthematous cases in Russia in January, 1922, 180,285 in February, and 213,102 in March. In Ukrania five million people died of starvation; in Charkow, the capital of Ukrania, five hundred thousand out of a population of eight hundred thousand died as a consequence of famine. Out of these one hundred and twenty-five thousand from the first to the twentieth of March.

LONDON LETTER.

(From our own correspondent.)

LONDON, *December* 23, 1922.

THE COST OF SICKNESS.

A meeting was held in London recently by the Industrial League and Council at which Lieutenant Colonel F. E. Freemantle, M. P., spoke on the economics of public health. He said, in part, that in the promotion of public health the many intellectual and moral advantages resulting from health could not be represented in financial terms, and there was danger of necessary services being curtailed as if the moral values were of no importance. In certain other fields, such as in education and religious matters, for instance, this was even more serious than in public health, for in these spheres no material profit could be definitely shown as a result of suggested expenditure. In public health there was this advantage that there were definite material gains from wise expenditure which could be shown to be reduced by a reduction of that expenditure. Definite statistical proof could be adduced to show that the ascertainable cost of sickness and disablement to the community of England and Wales amounted to no less than £150,000,000 a year. To this should be added large sums which it was impossible to express in financial terms. Judging from the estimate of £94,000,000 as the loss from tuberculosis alone, the estimated loss of £150,000,000 from all forms of sickness would seem to be greatly underestimated. But during the course of the public health movement during the past sixty years the improvement in health had given a very large possible increase in output which, reckoned on the basis of lives saved and the average wages of an agricultural laborer, sixty years ago, worked out at £62,000,000; but reckoned from the increased expectation of life amounted to £200,000,000 a year, several times as much as the amount spent on maintaining the public health services. It could not be claimed that all the loss to the community from sickness and disablement could ever be abolished, or that the public health services could be materially, if at all, diminished, but a large amount of sickness and disablement was still preventable. As an instance of what might reasonably be expected in the prevention of sickness in the near future, the possible elimination of tuberculosis should add £4,700,000 yearly to the exchequer, and £94,000,000 to the national income. It was obvious, therefore, that any effective measures proposed for the reduction of tuberculosis would be financially justified if consideration be confined to the material profit and loss to the exchequer. Many measures put forward in perfect good faith by experts and the public were not yet sufficiently substantiated to merit their adoption as effective. Many were advocated too much from the viewpoint of those who sought to raise out of the exchequer the material comfort of workers. While improvement in feeding and other social conditions might be expected to diminish tuberculosis and improve health it might have a precisely contrary effect if the methods adopted tended to undermine initiative, morale, and personal care of the individual. It was imperative for medical officers of health and for the medical profession generally, as expert guardians of the public welfare, to stand between the public and the government, to recommend to the latter only such measures as could be proved to have value and in putting forward suggestions and hypotheses to be most careful in stating the limiting conditions.

DR. CAIUS.

The University of Cambridge is an excellent training school for medical students during their first three years of study. The teachers are all of high rank, headed by the Regius Professor of Physics, Sir W. Clifford Allbutt, perhaps the most cultured and all round physician of the world. The college of Cambridge University in which the majority of medical students are trained is Caius College. It is indeed the medical college. The name of the college is rightly Gonville and Caius after the founder of Gonville Hall, but it is now always known as Caius College. John Caius, the second founder, was born in Norwich in 1510. His name was Key or Kaye, Caius being the Latinized form. In 1529 he became a student of Gonville Hall and eventually became a Fellow. Later he went to the University of Padua, then a very famous university for the study of medicine. He made a tour of Europe and became an eminent scholar and physician. In due course he accumulated a considerable amount of money and in 1557 decided to refound Gonville Hall, Cambridge. He gave a great deal of money for this purpose and arranged that in future the college should be called Gonville Hall and Caius College. In an English university a college was of higher status than a hall and the advancement thus brought about was due to Dr. Caius. He was elected nine times in succession as president of the Royal College of Physicians in London.

SCIENTIFIC FEEDING OF ANIMALS.

The lower animals, as well as human beings, are now being fed on scientific principles, and from investigations in this direction it is apparent that valuable lessons will be learned with respect to the feeding and nutrition of the human animal. At the Rowett Institute, Aberdeen, questions of metabolism and digestion are being considered carefully from the point of view of farm animals. Although the matter is still in its infancy several important facts have been discovered already and in the course of time we may expect the principles to be expounded properly and lucidly. The object, of course, is to discover the metabolic balance and when this knowledge has been gained to make use of it in such a manner that horses and stock of every description may be fed more nutritiously and economically. The greatest progress has been made with pigs, so far as nutritious and economical feeding is concerned, and indeed the scientific feeding of farm animals appears to be very encouraging. The main features of these experiments which promise to be of value when applied to the metabolism and digestion of human subjects are that blood pressure can be more carefully studied and it is possible to explore further the question of rickets. Heat production in the animal system may also be studied through the respiratory organs, and it is anticipated that useful and valuable results will be obtained. It may be said that in some ways better results may be expected with animals fed scientifically than with human beings. In man suggestion has enormous influence over the body and of course the processes of digestion. Strong emotions play havoc with the digestion.

CANCER IN KENT.

The Medical Officer of Health for Kent, Dr. Greenwood, states in his annual report that the death rate from cancer in that county steadily increases. The total number of deaths from this disease in 1921 was the highest yet recorded and gave a rate of 1.33 for the whole county, compared with 0.90 in 1910, the increase being nearly fifty per cent. Dr. Greenwood says that in round numbers one person in every 780 died from this disease and only heart disease caused more deaths.

SMALLPOX IN LONDON.

There has been no fresh case of smallpox in London for more than three weeks and only twelve patients are now under treatment. In pointing out the continued need for vaccination, Dr. E. E. Scrase, medical officer of health for Hempstead, says: "Outbreaks of smallpox rarely occur without a preliminary period, such as the present. Thus in 1902 smallpox was simmering in London for practically a year before it assumed epidemic proportions, and in the celebrated epidemic of Gloucester in 1895 and 1896 it averaged three cases a month for six months and then suddenly burst out with 733 in the eleventh month." Smallpox is breaking out in different parts of Great Britain and the menace of an epidemic has by no means passed. The sinister features of the London outbreak have been the virulence of the type (it was imported from Asia) and the prevalence of unvaccinated individuals.

CHANGES IN THE BIRTH RATE.

Dr. Bonar presided at a meeting of the Royal Statistical Society held on the evening of December 19th at which a paper was read by Mr. T. P. S. Jastrzebski on changes in the birth rate and in legitimate fertility in London, 1911 and 1921. He said that at the date of the census in 1911 married women under forty-five in the county of London numbered 540,419, or 11.95 per cent. of the population; in 1921 they numbered 549,373, or 12.05 per cent. Other factors being unchanged there should therefore have been a rise in the birth rate of roughly three per cent. But the age grouping of these women showed considerable diversity and there had been, in fact, a decline in the birth rate and this decline was ten times greater than could be accounted for by the lower "force of issue" due to the variation in the age groups. Both in the crude and effective birth rates the change in the decennium had been in the direction of lessening the gap between the social classes. The declining infant mortality had naturally been more favorable to the poorer than to the richer districts. In London as a whole legitimate fertility fell by twenty-five to the thousand married women under forty-five, or 12.75 per cent. Both in the birth rate and in legitimate fertility there was a decline of about one per cent. per annum in 1911 and 1921. But there was no necessity to talk about dying races and nations as yet. The immediate problem of the future was not of under population but of over population.

THE CHANGING TYPE OF DISEASE.

Is disease changing its type? According to a London physician it is, and he went on to say that practitioners in many parts of the country had told him they could no longer easily recognize the textbook descriptions of the various maladies. Influenza is fairly prevalent in London and in the country generally, but it is of a different type from that usually met with. It is not of a deadly character but affects the nervous system profoundly. Deep depression is a significant feature and recovery is slow. However, influenza has in the past exhibited itself in protean forms and therefore can hardly be given as a good example of a changing character of disease. It is true that many of the textbook descriptions of disease are inaccurate and sometimes misleading and that emendations should be made in conformity with disease as it is seen today. It may be added that some of the best British textbooks have been thoroughly revised recently and at least one excellent new one has been written.

NEW SCHOOL OF PATHOLOGY AT OXFORD.

Sir William Dunn's trustees offered to Oxford University some little time ago the sum of £3,000 for the adaptation of the existing pathology school into a future school of pharmacology. This offer will be accepted, but it is also proposed that the new buildings shall be erected in the parks. Opposition is being organized to the section of the proposed statute which provides for the building of the new pathology school in the parks.

LEGACY FOR NEW CHAIR AT GLASGOW UNIVERSITY.

Mr. William Gemmell, only brother of the late Professor Samson Gemmell, a noted surgeon and a professor of Glasgow University on the medical side, died recently in London and his will provides for £20,000 being devoted to the establishment of a new chair of medicine or science at Glasgow University.

OXFORD PROFESSOR WINS NOBEL PRIZE.

Professor Soddy has brought distinction to Oxford University by obtaining the Nobel Prize for Chemistry for 1921, for his work on the chemistry of the radioactive elements and the nature of isotropes.

POISONING AND DEATH CERTIFICATES.

Sir William Wilcox, the poison expert and medical adviser to the British Home Office, addressing a meeting of cremation authorities at the Guildhall, London, recently, criticized the present system of granting death certificates as an insufficient safeguard against cases of murder by poisoning. The statement was made in connection with a discussion as to whether cremation helped to conceal crimes of this character. At present, according to Sir William, the system of granting death certificates is extremely lax. They were sometimes filled up in a casual way before the doctor had satisfied himself as to the fact of death. There were numerous instances in which certificates were granted before the persons were dead. He asserted that the records of notable crimes, which would not have been discovered but for some fact brought to light after burial, illustrated the weakness of the death certificate system. If it were revised there would not be so many exhumations as at present and concealment of crime would be impossible. Medical practitioners were cautioned against filling in death certificates without an examination of the body and in each case there should be a consultation with other doctors. It was obvious that cremation would remove all traces of poisons such as arsenic, hyoscine, or strychnine, but the possibility of concealment of crime was largely guarded against by the formalities that had to be observed before cremation could take place. Two death certificates had to be given, one by an ordinary practitioner and one by a specialist.

MEDICAL MEN IN POLITICS.

Medical men in the present parliament number about the same as in the last. Ten were elected while thirty or thereabouts offered themselves for election or reelection. There was somewhat of a slaughter of the innocents—medical men in politics in this country are not only a negligible quantity, but an unknown quantity. No less than nine medical men stood as labor candidates. Perhaps it would be unjust to term them wolves in sheep's clothing, the reverse denomination might be more applicable—sheep in wolves' clothing, as sad to relate, the labor party here is more than tinged with communism, Bolshevism or whatever it may be called. The red flag has been flaunted a good deal of late, although it is said of the labor party that the tail wags the dog, that is, the extremists, the majority of whom are not English or Scotch, sway the policy. Of the nine medical men who offered to represent labor in parliament one was returned for a London borough. Dr. Salter, the man in question, is said to be a particularly brilliant man who has devoted his life to the welfare of the poor and from a material point of view has sacrificed his career to this cause. Of the medical men ousted the best known is Dr. Christopher Addison, appointed by Lloyd George the first minister of the newly established Ministry of Health. Dr. Addison fell from grace, but instead of taking the castigation in a humble spirit, he rebelled, and when the election came on presented himself as a candidate under other colors. He was rejected. A medical man who came to grief at the polls was Dr. Wansey Bayly, a somewhat frequent contributor to your journal. Dr. Bayly had the temerity to oppose Lady Astor in her stronghold of South Plymouth. Lady Astor was too strongly entrenched and the attack was fruitless. It may be said that women in this election had very bad luck. Lady Astor and Mrs. Withringham, both sitting members, were the only ones returned, and, of course, no doctor of the three or four female members of the medical profession who stood were successful. Sir William Watson Cheyne, the great surgeon friend and pupil of Lister, who sat for the Scottish Universities, retired in favor of Sir George Berry, F. R. C. S., who was elected. Dr. Nathan Raw, a well known authority on tuberculosis, who was chairman of the medical group in the last parliament, retired owing to his appointment as Lord Chancellor's visitor in lunacy in succession to Sir James Crichton-Browne. Of the new members Sir Sydney Russell Wells is the most distinguished. Prior to representing the University of London in parliament he represented, and still represents, the University on the General Medical Council, has been a member of the University Senate for twenty years, and has recently resigned the Vice-Chancellorship. Sir Sydney is an authority on the heart and contributed a splendid article to our special heart number. He is a good organizer as well as a man of culture. He is engaged in postgraduate teaching. It is a matter of some interest to know that H. G. Wells, the celebrated novelist and economist, contested the University of London in the labor interest. Mr. Wells was at the bottom of the poll. A distinguished medical member reelected without opposition for Queen's University of Belfast, was Sir William Whitla, the noted therapeutist and pharmacologist. It will be observed that Queen's University, Belfast, still has representation in the British Parliament, while Dublin University has not.

DEATH OF SIR NORMAN MOORE.

Sir Norman Moore, M. D., LL. D., Camb., F. R. C. P. Lond., F. R. C. P. Ireland, consulting physician and emeritus lecturer on the principles and practice of medicine at St. Bartholomew's Hospital; late president of the Royal College of Physicians of London, died at the age of seventy-five on November 20th last. During his entire career he was closely connected with St. Bartholomew's Hospital, and for nineteen years resided within its walls. Although he held many important medical posts, it is as a medical historian that he will be remembered.

Book Reviews

BIOLOGICAL PAPERS.

Treballs de las Societat de Biologia. Aug. sete, 1919. Publications del'Institut de Ciencies. Publicats sota la direccio de A. Pi Suner. Barcelona: Institut d'Estaudis Catalaus, 1919.

Thirty-five papers were read before the Biological Society of Barcelona at its various sessions during 1919, the transactions being as usual published in Catelan Spanish. The society has at present forty-seven active members, of whom twenty-five prepared papers alone or in collaboration. The subjects show notable variety and some of interest to the clinician are devoted to spirochetosis, utero-hemorrhagica, gas gangrene, syphilis, tetanus, spastic paraplegia, anaphylaxis, the peptone treatment of infections, influenza, pyocyaneus infections, and glycosuria. Others deal chiefly with problems of embryology, physiology, and biochemistry. The most significant article deals with the intratracheal injection of antipneumococcus and antistreptococcus serum in the pulmonary complications of influenza by Bossan. The author punctures the larynx and throws the serum directly into the trachea. He relates five cases in which the treatment caused a brusque defervescence. In two others the patients were in extremis. In the other eight the patients recovered but the author does not regard the cases of crucial importance, for they would doubtless have recovered in any case.

HEMORRHOIDS.

Das Hämorrhoidalleiden. Wesen, Ursachen, Klinische Bild und Therapie. Von Prof. Dr. Boas. Mit einer Abbildung im Text and sechs Abb Abbildungen auf einer Tafel. Halle a.S: Carl Marhold Verlagsbuchhandlung, 1922.

In the present monograph Professor Boas gives an excellent picture of the hemorrhoidal affections and their management. Among other important items Boas minutely describes his new method of abolishing piles by injections of alcohol. The method consists in producing first anesthesia of the anal region, then exposing the piles by means of a suction cup and injecting 0.5 to 1 c. c. of ninety-six per cent. alcohol into each hemorrhoidal tumor. Petrolatum is then put over the entire anal region and all the nodes pushed back into the rectum. The patient is kept in bed from four to five days during which period recovery takes place. The monograph deserves to be read by every practitioner who will find many valuable hints in the treatment of the above malady.

LABORATORY TECHNIC.

Untersuchungen über den Athergehalt in Blut, Milch, Harn und Expirationsluft bei Chirurgischer Athernarkose sowie über Narkoseazidose. Von Karl Gramën. Acta Chirurgica Scandinavica, Supplementum I. Aus der Chirurgischen Abteilung des Maria Krankenhauses, Vorstand Doz. E. Key, Stockholm. Stockholm: Centraltryckeriet, 1922. Pp. viii-146.

The author found the investigations conducted heretofore on the ether content in the blood, milk, urine, and expiratory air after surgical ether anesthesia incomplete and therefore conducted a series of experiments to determine these facts in a material of fifty patients (surgical, gynecological and obstetrical) as follows: He made quantitative determinations of the ether content of the venous blood, both during and after the anesthesia and during the socalled period of elimination of the ether in the urine and expiratory air, respectively; of the transition of the ether into the mother's milk and from the maternal blood into that of the fetus, and also of the ether inhaled unwittingly during the anesthesia by the anesthetist and the other surgical attendants.

The tests given also include the usual ether anesthesia in different kinds of patients, the socalled ether-rausch with different methods of the administration of ether and of ether plus oxygen anesthesia. Observations were also made on the drop method of administration and many good hints as to the technic are recommended for practical application.

In his investigations on acidosis following anesthesia, the literature is reviewed and special credit is given to the work of the American authors. The symptomatology, predisposing factors, prophylaxis and therapy, particularly the latter, both preoperative and postoperative, are given. Quantitative estimations of the total acetone and of B oxybutyric acid in the blood and urine after ether anesthesia and qualitative estimations of the acetone and diacetic acid in the urine were made. In conclusion, the author mentions some general points on the use of purgation and starvation before and after operation.

Taken by and large, this little monograph is an excellent publication, dealing with the theory and practice of ether anesthesia. A bibliography is appended.

PSYCHOLOGY AND SOCIOLOGY.

Psychoanalyse und Sociologie. By Aurel Kolnai. Internationaler Psychoanalytischer Verlag, Leipzig, Vienna, Zurich, 1920. Internationale Psychoaneslytische Bibliothek, No. 9. Pp. 152.

One need not agree with all the conclusions drawn by this author in regard to present sociological conditions. Yet one will find his book provocative of thought to such an extent that one will consider carefully his interpretative suggestions concerning the movements of the day. He first states instructively the relation which psychoanalysis as a psychology dealing with the individual has toward the more broadly directed science of sociology. Both must work toward the same final purpose. Both must come to an understanding of society in its historical development and in its present tendencies through the understanding of the individuals who compose society. Through them alone social institutions have arisen. Moreover the end of both methods of approach is the fitting of society and the individual into an adaptation which is based upon this knowledge of individual psychology and the relation of the social elements to the social whole.

There is first a review of the principles of psychoanalysis and its discoveries in regard to the individual constitution and to his adaptation or nonadaptation to society. This is followed by a fuller discussion of the analysis of present tendencies in society chiefly the communist movement and the anarchistic attitude. These are studied from the point of view of the infantile family complex and are found to follow out those patterns which Freud has pointed out in his *Totem and Taboo.* The study of these movements as regressive phases of particular forms presents stimulating questions for further analytical thought. They are shown to reveal the efforts made to solve the conflicts represented, either by a new progressive solution or by the slipping into regression. One will be moved to inquire of oneself and of the author in how far reader or writer is moved by his own emotional attitude toward a definition of these things in terms of the infantile conflict. For these questions are closely woven in the fabric of the life of today. Yet one is led to a profound consideration of these movements which is both illuminating and stimulating for sociological understanding. Moreover, one can be only wholesomely stimulated personally by contemplating in these problems those individual unconscious features which move society either toward new constructive action or which distort reason to serve overwhelming emotional attitudes.

GYNECOLOGY.

Clinical and Operative Gynecology. By J. Munro Kerr. London: Oxford Medical Publications, Henry Frowde and Hodder Stoughton, 1922. Pp. xvi-832.

This book is the result of an attempt to present the subject of gynecology in a clinical form, but it is by no means an exhaustive treatise nor is it intended to be so. It is divided into three parts: clinical gynecology, medical treatment and remedies, and operative gynecology.

The first section contains numerous, condensed case histories. Only a brief summary of the normal anatomy is given. A novel feature in the chapter on the examination of the patient is a tabulated and illustrated account of the lesions possible. The discussion of the endocrine glands is included in the chapter on the physiology of the female reproductive organs. The functional disorders are given more than the usual amount of attention. The nervous disorders of females are exhaustively discussed by Ivy Mackenzie. The development and malformations are treated collectively by T. H. Bryce. The venereal diseases, gonorrhea and syphilis and their complications, are covered by David Watson. A special chapter is devoted to the abnormal conditions in the urinary and intestinal tracts, which may simulate diseases of the female reproductive organs. Throughout the first part of the book, the gross pathology of the various diseases is given full consideration, but the details of the microscopic appearances and characteristics are omitted, as the book is intended merely for those interested in the clinical side of gynecology.

The second part deals with the medical treatment of gynecological diseases, both general and local. The author is not enthusiastic about ionic medication, which is described in the words of Samuel Sloan, nor is he enthusiastic about the different electric modalities. He considers x rays as the most important remedy in gynecology. Radium and its emanations he uses only in advanced cases of carcinoma and in operable, foul cancers as a preliminary and preparatory agent for surgery. Little importance is attached to local douching and vaginal tampons. He deprecates curettage in endometritis and extols the value of cauterization and disinfection of the uterus.

The third part includes the details of technic in the preparation of the patient, the paraphernalia and the attendants and some remarks on anesthesia by J. Pation Boyd. The author's experience with spinal analgesia was uncertain; sacral analgesia was not used and local anesthesia was used only for minor perineal and vaginal operations. The postoperative complications and their treatment are discussed in full. Blood transfusion and its technic are discussed by W. Rankin. Special chapters are devoted to the minor operations, operations for the correction of uterine displacements, operations on the uterus, plastic operations for malformations, operations on the ovary, the urinary tract and on the appendix and intestines, respectively. This part of the book may well serve as an atlas of gynecological surgical procedure, as each step is indicated by illustrations opposite to the verbal description. The illustrations, with the exception of twelve excellent colored plates, consist simply of line illustrations. This work is a reflection of conservative English gynecology.

MATERIA MEDICA.

The Eclectic Materia Medica, Pharmacology and Therapeutics. By Harvey Wickes Felter, M.D. Forty-eight full page half-tone plates. Published by John K. Scudder, Cincinnati, Ohio, 1922. Pp. 702.

This is one of the most complete and comprehensive books on materia medica which has yet appeared outside of the dispensaries. It shows a very intimate knowledge of almost every phase of materia medica, but is strongly colored with the author's own predilection for the specific medication of the eclectic school of which he is one of the leaders. In spite of his eclectic views, which he frankly avows, the work contains a great deal which would be of interest to every physician and which it would profit most physicians to study. The author is well versed in the history of the indigenous materia medica. Dr. Felter brings to the task of bookmaking a ripe experience as a practitioner, as an editor, as a teacher and as an author, and presents in this volume a work which is probably the most valuable contribution to materia medica which has been made by the eclectic school.

UROLOGY.

Propedeutique et Technique Urologiques. Avec 153 Figures. Bruxelles: Goemaere; Paris: Masson & Cie, Editeurs. 1922. Pp. 483.

The author has dedicated this volume to the memory of Guyon, Nitze and Albarran, and we feel, after a careful perusal of its pages, that it is quite worthy of these master urologists.

From a practical viewpoint the book is full of urological meat, so to speak. Every phase of diagnostic technic is considered fully and clearly. Beginning with the examination of urine and of the genital secretions, the author considers instrumentation, asepsis, urological anesthesia, urinary tests, the bladder, ureters and kidneys, as well as the technical examination of the prostate, seminal vesicles, vasa deferentia and epididymes.

There are additional chapters on urinary symptomatology in general and a most interesting discussion of biological products in the diagnosis of urological conditions.

The French reading physician will find a fund of information between the covers of this volume; much to our regret, we do not know of any book in English that can be compared with it.

EYE REFLEX.

Untersuchungen uber die eigenreflexe (sehnenreflexe) menschlicher Muskeln. Von Paul Hoffmann. Berlin: Verlag von Julius Springer. 1922. Pp. 106.

This study of the tendon reflexes, or as the author calls them, autogenous reflexes, deals with methods of examination, mechanical, electric, and special, as well as with the nerve paths of excitation and inhibition. His conclusions support the view of Exner that these reflexes act as a protective mechanism by maintaining a joint position whenever a rapid change takes place in that position against the will of the subject. The studies were carried out not only on the extensor muscles of the foot but on the musculature of the arms as well, and contain a great deal of interest to the neurologist, the clinician, and the student of physiology.

STEKEL.

Psychosexueller Infantilismus (Die Seelische Kinderkrankheiten der Erwachsenen). Von Dr. Wilhelm Stekel. Berlin and Vienna: Urban & Schwarzenberg, 1922.

Among the subjects considered are Rejuvenation (referring to the longing for past youth), Urinary and Anal Sexuality, Zoanthropy and Zöophily, Pedophily, Gerontophily, Exhibitionism, Narcissism, Mysophily, Attacks of Rage, the Eternal Nursling, the Eternal Boy and Girl, and various other behaviors and types of men and women who literally "never grow up" in certain directions. Among the laity "people who never grow up," "big overgrown boy" men and the like are usually lovable characters, but in Stekel's book the youthfulness is not open—it is marked under vices, fanaticism and criminality and other abnormalities. Much of the subject matter, if not most of it, is usually discussed under sex perversions (not meaning inversion, for homosexuality is omitted throughout). The book is volume five of the author's *Störungen des Trieb-und Affektlebens.*

DIAGNOSIS.

Lehrbuch Klinischer Diagnostik und Untersuchungsmethodik für Studierende, Medizinalproktikanten, und Aerzte. Von Prof. Dr. Theodor Brugsch, Oberarzt d. H. Univ-klinik, Berlin, und Prof. Dr. Alfred Schittenhelm, Direktor d. Med. Klinik, Kiel. Fifth Edition. Berlin and Vienna: Urban und Schwarzenberg, 1921.

The present volume comprises 968 pages and 418 text figures. In their preface the authors style the late war and reconstruction period "the revolution." The work appeared originally in 1908, the third edition just before the war, and the fourth in 1918. The size has undergone but little change since the first appearance of the work. The postbellum era has seen a reawakening scientific ardor and the authors have given their readers the full benefits of electrocardiography and abdominal röntgenography. Other advances are in the application of micromethods to diseases of metabolism and a revision of the symptomatology and diagnosis of uterus. The Aschoff school is followed in dealing with tuberculosis.

PRIMITIVE.

Batoula. By Réne Maran. New York: Thomas Seltzer, 1922. Pp. 207.

Batoula, a novel by Réne Maran, a full blooded negro, was one of the literary sensations of Paris in 1921, the year of its publication. Its author was the recipient of the Prix Goncourt. Although the book is doubtless epoch making in the literary history of the African as the best work of fiction as yet produced by a full blooded negro, it seems hardly worthy, judged from unbiased literary standards, irrespective of the racial element, of the great sensation it created in France or of the high honors bestowed upon it. The narrative is too unproportioned and too sketchy to be high art in fiction. The book consists of a series of pictures of the life of Batoula, an African chieftain of the French Congo, ending with his death from the blow of a panther's paw. The much discussed descriptions of the Feast of the Circumcision and the Dance of Love contain nothing new to those who are conversant with symbolism and folk lore, although there may be a certain element of value in these scenes as portrayed by a member of the race itself, nearer to the heart of the people than others could be. The characters are drawn sincerely and without prejudice on the part of the author, but the vivid and dramatic style gives the book its greatest claim to literary value. Its real value, however, lies in its sociological significance as a poignant and unbiased picture of racial interactions, with suffering and tragedy on both sides, especially for the downtrodden black man.

LOYALTIES.

Loyalties: A Drama in Three Acts. By John Galsworthy. New York: Charles Scribner's Sons, 1922. Pp. 110.

Loyalties, now being played by an excellent English company, is so far the outstanding theatrical production of the season. The play is not only a masterpiece of dramatic art, but a most subtle and revealing study of individual human nature and group psychology. The author shows himself to be the keenest of analysts in his understanding of the motives guiding human conduct. The motif underlying the action seems to be the proneness of most people to think and act, not so often from a sense of truth, or of the moral, ethical, or social aspects of a set of circumstances, but from certain affective responses to the situation, sometimes of personal and sometimes of group origin—call them loyalists, prejudices, taboo, or what you will—still they persist in a world just beginning to realize their existence (this realization is cleverly brought out in the lines of several of the personages in the play) as the prime motives of most human conduct.

De Levis, a Jew, "young, rich, and new," has succeeded in getting himself invited to a rather exclusive English house party. While a guest there, a sum of money is stolen from him, and the whole of the play is concerned with the reactions of the various characters to the situation caused by the theft. These reactions involve necessarily various mental conflicts; that of loyalty to client against loyalty to profession; of race against race; of friendship and social "set" against an outsider; of varying standards of social behavior; of the love of a wife against a suspicion and subsequent knowledge of her husband's guilt; and of the husband's effort to live up to that love against his cowardly desire to run away from an entangling net of circumstances, which culminated in his escape from reality through suicide. The portrayal of this young officer, charming, popular and a daredevil in physical courage, yet a mental and moral weakling in the face of the less sensational realities of life, proves Galsworthy to be as keen an analyst of some of the pathological phases of human conduct as of its more normal manifestations. To the observant student of human nature, the real character of Captain Dancy, retired, winner of the Distinguished Service Order, is most subtly and cleverly revealed continually throughout the play, from the first mention of him making wild jumps as parlor "stunts" at the houseparty for a bet to help compensate for heavy losses just suffered at the races, to the pitiful note left when he shot himself. "It's only another jump," he said, and, even in the end unwilling, or unable, to face realities, he shifted the blame for the tragedy upon his friends—"A *pistol* keeps faith." There is no more vivid picture in modern literature of maladaptation and its often tragic consequences.

"Mere 'loyalty' is not enough," Galsworthy seems to tell us through almost every line of this understanding drama of human life. "What else is necessary?" Some day perhaps the physician, the psychologist, the sociologist, and the statesman, working together, will answer.

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Medicoliterary Notes.

In the recently issued annual report for 1921 of the Montclair Board of Health, it is recorded that there was an entire absence of smallpox in Montclair during that year. In contrast to this record the disastrous experience of Kansas City, Missouri, during 1921 is quoted: "Nearly a thousand cases of smallpox were reported during the year, and it is entirely probable that there were as many more mild unreported cases. The loss to business and to Kansas City's reputation can be expressed only in terms of millions of dollars. When several hundred thousand persons had been vaccinated, the epidemic stopped, because in a vaccinated and therefore protected community, there is no fuel on which the smallpox can feed. The cost of vaccinating Kansas City's people was several hundred thousand dollars. This amount of money pales into insignificance when it is compared with the suffering that the disease cost and the millions of dollars' damage done to business. How much better it would have been for the people to have been vaccinated before the epidemic came!"

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A recent bulletin of the New York City Department of Health describes improvements in the hospital service of the department within the last few years. The report says: "In medical progress, the hospital work shows at least two noteworthy improvements. First is the care and hygienic education of women prisoners committed from the courts to the custody of the department of health's hospitals for treatment of venereal diseases. The far-reaching, good effect of this procedure cannot be overestimated. Second, drug addicts, having reached such a stage of degradation as actually to become a menace to the weakminded and young in the community with whom they come in contact, their disease was declared to be a pestilential one and the department of health proceeded to make, in Riverside Hospital, a place of treatment where the addicts could be effectually taken off the drug."

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Summer Play Schools in New York City is the title of an article in *School and Society* for October 14th by Mary G. Armstrong.

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The *Atlantic Monthly* for December contains, among other articles of interest, The American Jail, by Joseph Fishman.

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A recent number of *Epidemiological Intelligence,* published by the health section of the League of Nations, quotes statistical information about the depopulation of Russia during recent years. Of all the causes to which this is attributed, epidemic diseases have caused the greatest loss of life. The following causes are given for the decline in population: 1. Emigration following the civil war, estimated at two million; 2, military losses in the world war, two million five hundred thousand; 3, loss of life in the civil war estimated at one million; 4, excess mortality largely due to the great epidemics, estimated at, at least, three million five hundred thousand. Another statement of interest is that the birth rate, extremely high before the war, averaging forty-five to the thousand of the population, has declined by more than forty per cent.

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Six Characters in Search of an Author, translated from the Italian of Luigi Pirandello, is one of the cleverest and most original plays now running in New York. Six characters have been created by a playwright, but abandoned when the latter found that probably no theatre could be found to carry out adequately the ideals upon which his prospective play was based. These characters appear at the rehearsal of another play and demand that the drama for which they were destined be presented. Pirandello's play is a satire upon the liberties taken by managers and producers with the conceptions of authors.

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The October number of *Health News,* the monthly bulletin of the New York State Department of Health, is an issue of unusual interest. Among leading articles are The Layman in Public Health, by Dr. Livingston Farrand, recently elected President of Cornell University; Politics and the Health Officer, by Dr. Matthias Nicoll, Jr., Deputy Commissioner of the State Health Department; Problems of a Rural Health Officer, by Dr. Stanton P. Hull; and The Health Officers' Opportunity for Research, by Dr. Burdge P. MacLean.

Practical Therapeutics

ELECTROMAGNETIC WAVES AS A THERAPEUTIC AGENT.

An Appreciation of the Electronic Theory.

By C. Everett Field, M. D.,
New York,
Director, Radium Institute of New York.

SUMMARY:

A. That electromagnetic forces govern the transit of substances (electrons) making up elementary ether.

B. That the electronic theory of all matter permits the argument of an electromagnetic influence fostering the exchange of electrons.

C. That the physiological and biochemical functions of the human body in health depend notably upon the electromagnetic wave phenomena commonly described in the ionization and colloidal state.

D. That any departure from the normal condition of tissue, bone or fluid cell structures, calls forth an altered chemistry with consequent disordered and distorted process of autolysis.

E. That the pathology resulting can, and is, favorably acted upon by certain artificially induced electromagnetic forces of soft and minute wave lengths, to the extent that both autolytic and catalytic processes are stimulated.

F. That while the free exchange of artificial and normal electromagnetic wave influences within the body may not be proven physically, extensive clinical data support strongly the theory advanced.

In the *Boston Medical and Surgical Journal* of December 14, 1922, Dr. Bronson Crothers states: "Quite unconsciously the joy of discovery often forces announcement before the finders know exactly what they have found. The virtues of the effective pioneer rarely include reticence or understatement." I heartily agree with this statement, and holding it as a warning, have tried to summarize my report with at least a shade of conservatism. The abundance of clinical success with the electromagnetic wave therapy permits me to make a plain statement without much reservation. At the same time we must acknowledge that we do not know exactly what we have found, owing to a lack of laboratory check up. How far our future study of this type of physical force will carry us, we cannot tell; therefore, under the circumstances, we prefer to class this contribution as a preliminary announcement.

It has always been the hope of the practitioner that he could secure the aid of additional adjunct measures of treatment that would hasten the processes of resolution, aid in the reduction of congestion, edema, and pressure symptoms. Various types of physical therapeutics are therefore utilized in the ultrachronic conditions often referred for our special study.

Many of the long advanced cases of arthritis come to us with the causative features of their pathology well studied and remedied, but the results of the infection still remain, despite a long effort at treatment. In our opinion, drug therapy in such cases is of little value, and our attention for several years has been focused on all measures of physical therapy. Obviously the theme of arthritis involves the great question of disordered metabolism, and when one enters that field, he immediately opens the door to a host of other diseases that could be considered under the same study. Therefore, my statement will be generalized to cover varied types of cases that have been influenced.

Recognizing the value and limitations of vibratory force, high frequency current, and the ultraviolet ray in controlling muscle and nerve cell stimulation, and in exerting sedative and anodyne influences, we have been interested in securing modifications of the electrical current that would deepen wave impulses. Seemingly we have now secured a simple apparatus producing electromagnetic bombardment of the deep tissues, with wave currents of sufficient penetration to aid in the reestablishment of circulation and fostering the chemical processes of repair.

A full acceptance and appreciation of the electronic theory as represented in the ionization and colloidal state of the human metabolism, must be acknowledged as a basic fact. Furthermore, we must recognize that in a perfect state of health and under proper metabolism, with all the forces that influence its autolytic and catalytic processes, makes its chemical change under fixed conditions. Slight departure from the normal quickly influences body chemistry, and the movement of the electronic bodies of all types is interfered with. Any injury of the functions of any organs of the body calls on the reserve forces of other organs, tissues or fluids to aid in the repair. Interference with the circulation consequent to organic disease calls forth increased effort on the part of our reserve chemistry. Any material change in the chemistry of the fluids of the body at once call on the various glands that govern the chemical makeup of the body for increased service. In such conditions we look for aid to any force that may act to increase the normal chemical reserve of the body. We often find that certain agents act as synergists, in that they serve to increase or hasten normal chemical processes. In our opinion we have in certain modifications of the electromagnetic wave a force that is harmoniously received by the normal ionization processes, and which materially influences metabolic function. There have been many experiments to prove the response of electrons through the effect of a magnetic field and ample proof is forthcoming to show that the transmission of electrical oscillations secures its response in the electronic constituents of the human body to the extent that improved chemical processes are noted. In other words, it is possible to hasten the normal processes of both autolysis and catalysis by means of a properly modified electromagnetic current.

We recognize in our work with radium in diseases of faulty metabolism, that the tremendous energy of alpha and beta electrons exert a beneficial influence on account of their positive and negative electrical characteristics. Following the introduction of this force within the body, prompt and definite changes are noted in many of the processes of metabolic function. Studying quite intensively this phenomenon there was made apparent the similarity of the wave of electrons thrown out in the disintegration of radium and the positive and negative waves of electrons we find in the ordinary electric current. In the negative current we exhibit a stream of electrons moving actively on their course, and as a positive type, these electrons may appear as atoms with the nuclear element predominating. We agree fully with the theory that the entire human body is but the construction of an enormous laboratory functioning largely under electromagnetic influences. It is readily seen, therefore, that various physical agencies of treatment may tend to stimulate processes of healing and repair in conditions where drugs might be given with no power to reach the affected organ or tissue. With the truth fixed a study of the various means of transmission of electrical oscillations becomes interesting. The application of an alternating magnetic field should tend to stimulate peripheral and deep circulation to a varied depth and distance from the coil. Furthermore, when the impulses of the stream of electrons exerts its force upon the body electronic stream, the full extent of such transmission cannot be estimated correctly. The physiological changes made apparent in the clinical picture can be observed and reported upon.

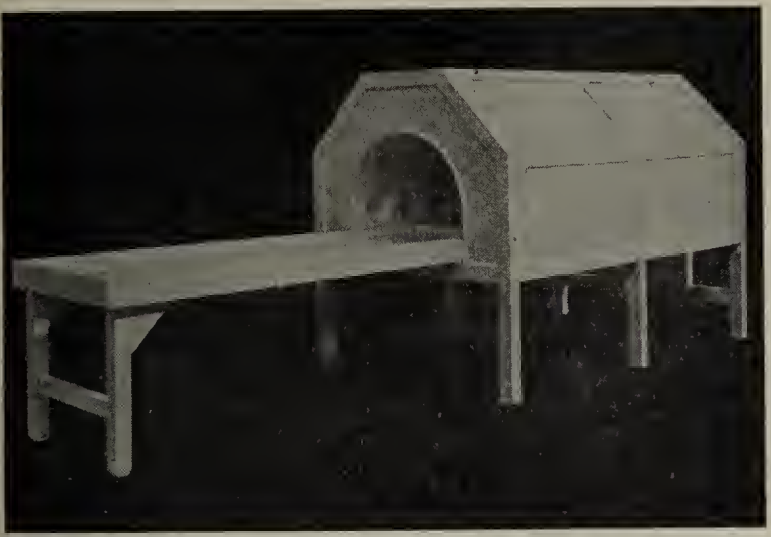

Fig. 1.—Apparatus used for treatment.

Early in 1922, Dr. Roland F. Wear, of Berwick, Pa., called to our attention his preliminary report on the use of a special coil which he had termed an electron emanator. This apparatus consisted of disc like plaques measuring about ten inches by an inch and a half each, made up of some seventeen hundred feet of insulated copper wire. This coil used single or multiple is applied and regulated under simple control of the operator, to permit the entire energy from a 110 alternating current, sixty cycle current, to be brought in contact with the patient, in close or distant range, varied as seems best indicated. The same current is used in conjunction with the thermic influences of the electric light cabinet in some of our experiments. The technic is simple and few contraindications are met. The single device weighs about fifteen pounds, and its weight is supported by special apparatus. As the rapid stream of electrons flow through the coil, there develops a form of vibration together with a gentle hum, noticeable, but in no wise unpleasant. After about sixty minutes of application, the coil becomes quite warm and may need additional padding or distance screen.

Certain physiological influences manifest during a series of treatments with the electron oscillator are evidenced directly on the tissue treated; on the eliminating organs and body chemistry. Probably the most pronounced single effect noted is the anodyne influence; almost any type of pain, that has come to our attention, has been markedly lessened or completely relieved. A distinct tonic effect is commonly met in a majority of the cases of our series, accompanied by a material increase in the erythrocyte count. Its application over areas of scar tissue and fibrous adhesion, such as are commonly met in the arthritis cases, tends to restore circulation and lessen rigidity. In our opinion the most startling effects have been met in ameliorating the pain met in our gynecological cases, particularly in those suffering either from malignant or benign conditions.

Among the benefits that may be derived from the electromagnetic wave phenomena are for the pains of all acute and subacute inflammatory processes. Pain associated with pressure symptoms, arthritis of subacute and chronic types, myalgias, pain associated with scar tissue formation or postoperative states, uterine and ovarian pain, neuritis, certain types of paralysis, pains associated with tabes, etc. From this brief outline many other indications will at once reveal themselves to the clinician.

The adaptability of the electromagnetic therapy as described awakens the possibility of a very wide field of application. While we are free in the opinion that this measure should be classed as that of an adjunct type of treatment, we will report a few cases wherein the electron emanator was the only means of therapy used.

Case I.—Mrs. M. G., aged thirty-nine, had been referred with a diagnosis of uterine carcinoma of the hopeless, inoperable, type. The pain was very severe, controlled only by three grains of morphine sulphate daily. The pain radiated anteriorly over lower abdomen and down the sides of the thighs; posteriorly, deep in the sacral region and following to the deep pelvic nerves. Application of the current, both anteriorly and posteriorly, in periods of one hour twice daily gave prompt relief. The administration of morphine was discontinued except the night dose of half a grain by mouth. The pain was controlled over a period of seven weeks of application.

Case II.—Mrs. J. C. L., a noninstitution case, aged forty-three. The diagnosis was dysmenorrhea, resulting from a chronic endometritis of nine years' standing, corrected three years previously by operation. Her previous condition showed marked retroflexion of the uterine body. She suffered terrific pain for ten days at each period during the past seven years. She was of the neurasthenic type, poorly nourished and a semiinvalid. During eight weeks of treatment, the electromagnetic current was administered daily for a period of an hour and a quarter, discs being placed on the lower abdomen and sacral regions, with fifteen minutes of rest midway between treatment. The pain was controlled at the first menstrual epoch to a short period of one hour's distress on the first day. No pain was evidenced during the second monthly period. An interesting feature was that the patient showed a gain of nine pounds in weight in two months. The blood count was as follows: October 23, prior to treatment, red cell count 3,600,000; on December 21st; the count represented 4,700,000. Marked general improvement was noted, the woman taking up all her household duties. During the fifty-two days of observation, treatments were made on twenty-eight days.

CASE III.—Mrs. J. C. M., aged fifty-four, suffering from multiple neuritis associated with mammary carcinoma (postoperative). She had been operated upon with complete removal of glands of left breast and axilla seven months previously. During the past four months she had suffered intensely from lancinating pains through left shoulder and extending down the arm, also from some intercostal pain running under the scapula. There was general tenderness of the tissue over entire left chest. The patient had refrained from using narcotics, but was meeting with poor results from forty grains of aspirin daily. First four applications of the electron oscillator gave little effect, the discs being used single in each area with forty minute periods. Following the application of twin coils with sixty minute application relief of pain was effected within fifteen minutes of start of treatment. Complete relief during the first ten days thereafter lasted each day about ten or twelve hours. After five weeks of treatments (every other day) the pain was practically gone. During the last week of treatment the pain was evidenced but once and then for a few moments only.

CASE IV.—Mrs. A. N. F., aged fifty-two. The diagnosis was chronic progressive arthritis, all joints affected, some enlarged to twice their normal size. The condition had existed a year and a half. She was lifted out of bed each morning and remained in a wheel chair all day. There was complete atrophy of the muscles with hamstring contractions. She was classed as an "impossible case" and referred for radium therapy. The pain was so severe, especially where hamstring contractions prevailed, that radium treatment was deferred. The chief seat of pain was down the back of the thigh, across the shoulders, and along the muscles at both sides of the neck. Electromagnetic current was applied forty minutes daily on three separate areas for fourteen successive days. Gradual relief of pain was experienced with definite but limited restoration of motion reported. Three weeks of treatment gave complete relief of pain except that shown on forced motion. Radium therapy was then instituted with continuation of electric vibration. The patient gained five pounds in weight during six weeks of treatment as indicated prior to the adoption of radium treatment.

CASE V.—Capt. J. E. A diagnosis had been made of Raynaud's disease following frozen finger tips on both hands during aeroplane flights in France in 1917. There developed an endarteritis obliterans, with tendency toward gangrene, and loss of sensation at tips of fingers with extremely poor circulation. During the winter months the tissue of the entire hands showed capillary circulation blanched out with weak white skin. Heat, various types of electric vibration, and massage were used by reconstruction hospital with no permanent service. Admitted October 12, 1922 and placed on weekly treatments with the combined crossfire energy of two coils of the electron oscillator. Six applications resulted in markedly dilating the terminal capillaie, with consequent improvement in sensation. Ulceration at tips of fingers healed and apparently a permanent clinical cure was obtained.

323 RIVERSIDE DRIVE.

Case VI. will appear in the author's reprints.

NONSURGICAL TREATMENT OF INTERNAL HEMORRHOIDS.

By CHARLES D. AARON, M. D.,

Detroit.

The following cuts were inadvertently omitted from the paper on the Nonsurgical Treatment of Internal Hemorrhoids, by Dr. Charles D. Aaron, which appeared in the NEW YORK MEDICAL JOURNAL AND MEDICAL RECORD, for December 20, 1922.

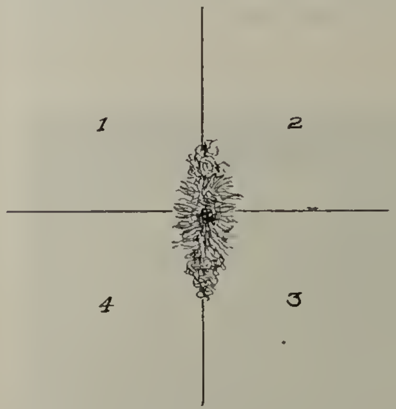

FIG. 1

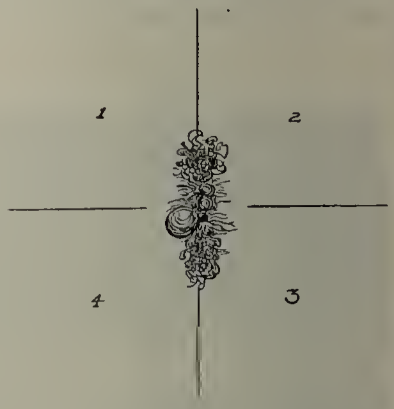

FIG. 2

FIG. 1.—These are imaginary lines, dividing the anal region into four areas (quadrants), as an aid to the operator in injecting these areas in succession until the entire region is treated. It is important that the picture of these imaginary lines be fixed in the operator's mind, and that a record be kept of the first quadrant injected, or as each quadrant is injected—for it may not always be advisable to begin with No. 1. The most troublesome hemorrhoid may require first treatment. When, however, the case is one that simply requires obliteration of hemorrhoidal veins throughout the whole extent of the rectal lumen, the injections may proceed in numerical order from quadrant No. 1 to quadrant No. 4. The patient's right anterior anal quadrant is No. 1, the left anterior No. 2, the left posterior No. 3, and the right posterior No. 4.

FIG. 2.—Protruding internal hemorrhoids.

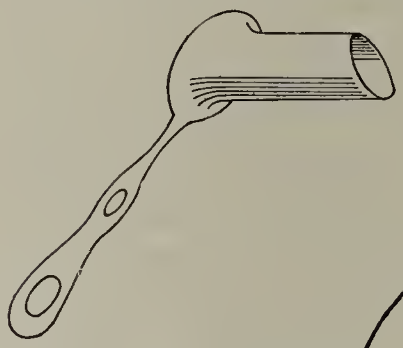

FIG. 3.—Oblique anoscope without obturator. The use of this instrument confines the field of operation to the quadrant to be treated and makes the insertion of the needle in the proper place a very simple matter, as shown in Fig. 4.

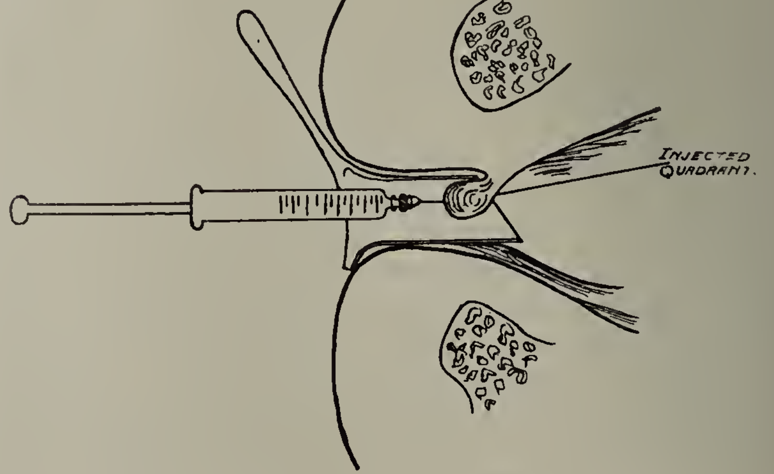

FIG. 4.—Needle introduced in centre of quadrant.

Proceedings of Societies

SOUTHERN MEDICAL ASSOCIATION.

Sixteenth Annual Meeting, Held at Chattanooga, Tenn., November 13 to 16, 1922.

The President, Dr. Seale Harris, of Birmingham, Ala., in the Chair.

Malaria in Children and the Abuse of Quinine.—Dr. Eugene Rosamond, of Memphis, Tenn., stated that the laboratory test for malaria was reliable in practically one hundred per cent. of cases. The incidence of age did not affect the clinical course of malaria. The abuse of quinine in overdoses to children was almost universal throughout the South. The giving of quinine in sugary syrups to infants and children with gastrointestinal diseases might aggravate the existing condition. The giving of overdoses of quinine might account for many nervous phenomena not explained otherwise.

Septic Meningitis in a Five Year Old Child.—Dr. W. A. Mulherin and Dr. V. P. Sydenstricker, of Atlanta, Ga., said that septic meningitis due to organisms resembling streptococcus viridans, but differing very much in growth, morphology and toxic properties, was observed in this five year old child. The primary focus of infection probably was the tonsils. The root of infection probably was through the lymphatics and not hematogenous. There was excessively high fever, 113° F., when bronchopneumonia became superimposed. There was localized encephalitis in the area of red nucleus, probably contributing to the height of the fever. Patient's blood agglutinated offending organism in dilution one to forty, showing acquired immunity. More general and scientific work and study should be given septic meningitis cases. If such was done, more definite specific knowledge would be obtained, which would help to lower its excessively high mortality.

Practical Points on Purgation.—Dr. Lewis W. Elias, of Asheville, N. C., stated that the alimentary canal was an absorbtive organ, the kidneys doing the elimination from the body tissues. Merely because the patient was sick was no reason for a purge. Most patients were best helped by water, food, and such hygienic measures as tended to build up resistance. If the lower bowels needed emptying, it should be done with an enema. This procedure was in line with the best thought of the time, but we were unconsciously influenced by long established custom.

High Voltage X Ray Therapy: A Six Months' Experience.—Dr. Sherwood Moore, of St. Louis, Mo., said there was no inherent superiority in so-called high voltage x ray therapy over the older methods and over the employment of radium save that it was far more efficient. Experience in treating 214 cases over a period of six months would indicate that the earlier of these cases derived sufficient benefit to make this the therapeutic agent. Even in advanced cases the relief of pain and the sometimes astonishing subjective improvement brought about by this method of treatment would indicate its application regardless of the hopelessness of effecting a cure.

Sectional Feeding.—Dr. A. J. Waring, of Savannah, Ga., stated that our general methods of presenting dietetics to the laity were possibly not wholly perfect. Sectional variations in diet, often confusing to the mother, were explainable and avoidable. The Southern pediatrist had his own very particular and very difficult problems in dietetics to handle, influenced markedly by local conditions.

X Ray Versus Radium in the Treatment of Uterine Hemorrhage.—Dr. Jackson W. Landham, of Atlanta, Ga., said that surgical treatment of uterine fibroids and myopathic bleeding was indicated in a very limited number of cases. An accurate diagnosis which might demand a preliminary curettage was absolutely essential. Since uterine hemorrhage might be controlled without producing a premature menopause, age did not necessarily constitute a contraindication to radiotherapy. Women with undeveloped sexual functions, pelvic inflammation, cervical or uterine polypi, pedunculated or degenerating fibroids, malignancy of the body of the uterus or large adherent fibroids producing pressure symptoms, should be treated surgically. Statistics and his personal experience with x ray and radium convinced him that röntgenotherapy was the method of choice in the management of these cases, except in patients who had marked hemorrhage. These should be treated with x ray and radium so that a quick result might be obtained. The technic he suggested contemplated a gradual menopause so that the unpleasant symptoms, characteristic of this period, might be prevented as much as possible.

A Few Points in Radiotherapeutic Technic of the Face and Mouth.—Dr. Walter A. Weed, of Birmingham, Ala., stated that in the treatment of epitheliomata involving the margin and mucous membrane of the eyelid, he cocanized the eye, covered the eyeball with a suitably designed piece of lead covered with rubber, and everted the eyelid if necessary by means of adhesive plaster, a stitch, or a pair of chalazion forceps, and treated intensively. Likewise, lesions of the inner canthus might be given treatment just as intensive as desired without danger to the eye itself or to the surrounding tissues. Lesions in this location were nearly always of the basal cell type, and in most instances amenable to radiotherapy. It was preeminently the method of choice because of its efficacy, and the unapproachable cosmetic results. The question of choosing between x ray and radium was largely one of convenience. Everything else being about equal, he usually employed the x ray because of the time saving factor. Another class of lesions that were often maltreated or untreated was malignancies of the lip, and especially of the inside of the mouth.

Group Medicine: A Critical Survey.—Dr. Warren T. Vaughan, of Richmond, Va., stated that group practice was a distinct advance in clinical medicine. It was not without its shortcomings and these should be recognized and remedied, if possible. Most of the discussions of group practice so far had either been laudatory by members of groups or condemnatory by nonmembers. We had now reached a stage where members of groups, who from their experience were best able to recognize the weak points and shortcomings of the system, should air these disadvantages and attempt to remedy them. Group practice in some form had come to stay. It was the duty of the profession who were interested in the work to devote their energies to establishing the most satisfactory form.

Treatment of Arterial Hypertension.—Dr. Ralph N. Greene, of Jacksonville, Fla., stated that hypertension cases seen by the neuropsychiatrist were potentially mental subjects. They required comforting assurances, but at the same time a clear understanding that untreated they were subject to the dangers of developing brain, heart, and kidney diseases. They should be trained in the habit of quiet living, moderate salt intake, and reduced fluid intake to a degree compatible with renal health. They should learn that drugs were not used for hypertension ordinarily, but were applied for specific complications. Hypertension patients should be educated to a realization that less worry and more optimism were desirable. Food should be desired by the hypertension patient in quantities only sufficient to maintain a minimum of weight compatible with health. They should learn that using teeth for purposes other than digging one's grave, figuratively speaking, in suicidal gormandizing practices at the dining table would surely be rewarded by a reasonable degree of good health, happiness, and longevity.

The Mental Disease Problem.—Dr. George L. Echols, of Milledgeville, Ga., said that mental disease was a staggering problem, economic, social and humanitarian. Mental disease was apparently on the increase. A person requiring hospitalization from a neurosis or psychosis was just as much incapacitated and had a disease just as real as another person with a fractured leg or pneumonia. These conditions were most amenable to treatment in the prepsychotic and early psychotic period, and it was the family physician who saw the patient in this period.

Bacillus Acidophilus; Results of Feeding Milk Culture.—Dr. George C. Mizell, of Atlanta, Ga., stated that relief from chronic intestinal stasis and toxemia of the putrefactive type, even in the presence of intestinal adhesions, had been secured by feeding bacillus acidophilus milk culture in conjunction with a general diet. Chronic ileocolon and colon stasis of undetermined origin, as well as secondary to intestinal adhesions, might be relieved by feeding bacillus acidophilus milk. When results were not so secured, additional measures of a nonirritating character directed to the relief of the constipation and some modification of diet might render the treatment effectual.

Spasm at the Cardia and Cardiospasm.—Dr. Julius Friedenwald and Dr. Theodore H. Morrison, of Baltimore, Md., stated that from their study of 133 cases of spasm of the cardia and cardiospasm, as well as from the cases recorded in the literature, they had come to the following conclusions: It was extremely important to differentiate between the two affections. While the former was purely an acute affection noted in neurotic individuals, the latter was chronic in character associated with more or less organic change about the cardia, with a certain degree of dilatation of the esophagus. A thorough clinical study, with fluoroscopic and esophagoscopic examinations, would usually clear up the diagnosis without difficult. While spasm at the cardia could usually be treated successfully by means of the simple methods originally employed in overcoming functional nervous affections, cardiospasm could only be overcome by means of forcible dilatation. Since spasm at the cardia was purely a functional condition and usually preceded the more serious and organic lesion of cardiospasm, early recognition and eradication of the former would do much prophylactically in diminishing the incidence of cardiospasm.

Cancer of the Stomach.—Dr. John B. Fitts, of Atlanta, Ga., said that early stomach cancer presented no special syndrome. Dyspeptic symptoms in previously well adults should be accounted for. Patients suffering from long continued digestive disturbances should be frequently reexamined. Thorough chemical, microscopical and röntgen examinations gave positive evidence for or against an existing malignancy.

Tropical Sprue.—Dr. Daniel N. Silverman and Dr. Willy Denis, of New Orleans, La., stated that the results of their observations in the case reported did not warrant any general conclusions. They had shown that the enzymes of duodenal contents in a case of sprue were present to a considerable extent during the clinical course of the disease, and that these enzymes greatly increased in strength even up to normal amounts during clinical improvement of the case. These facts would lead them to believe that in tropical sprue the pancreas did not always undergo extensive or permanent damage and that this gland might assume its normal digestive function.

Digestive Hemolysis as a Test of Liver Function.—Dr. A. L. Levin, of New Orleans, La., said that from a study of the forty cases reported by him and a number of cases studied by others, he had come to the following conclusions: 1. Liver pathology could probably be detected early by the test of digestive hemoclasia of Widal. 2. In a study of gallbladder infections, it should be borne in mind that the pathology often began from the liver end, and if this was true, attention should be directed to that organ first. 3. The socalled intestinal toxemias and simple cases of indigestion were probably of hemoclastic origin. 4. Hepatic opotherapy undoubtedly influenced the Widal hemoclasia test. 5. A large proportion of cholecystitis and cholelithiasis cases gave a positive hemoclasia of Widal and the results of treatment, whether medical or surgical, should be checked up by the Widal liver test. 6. Diseases arising from protein hypersensitiveness should be studied by this test. 7. The test was not conclusive, but it invited enough interest for further observation and study. 8. It should be adopted as a routine laboratory test.

Deafness in Congenital Syphilis.—Dr. Albert Keidel and Dr. Jarold E. Kemp, of Baltimore, Md., reported twenty-two cases of deafness due to late congenital syphilis. The incidence of this form of deafness was approximately ten per cent. Males were more susceptible, particularly negro males. The age of onset approximated that of puberty. The onset might be sudden or gradual and was usually accompanied by tinnitus and vertigo. The symptom complex was characteristic. Active manifestations of congenital syphilis other than aural lesions coexisted with or antedated the malady and were often of unusual severity. Of these interstitial keratitis was the most common. The blood Wassermann test was positive in over ninety per cent. of the patients, spinal fluid was invariably negative for abnormalities due to cerebrospinal syphilis. Cranial nerves other than the branches of the eighth were rarely involved. The prognosis was not good, and the results of treatment were poor. Adequate treatment of all patients with congenital syphilis was advocated as a prophylaxis for late aural involvement.

Relation of Gastroenterology to Other Specialties.—Dr. A. W. Galloway, of Asheville, N. C., said that a gastroenterologist had a field sufficiently large of his own and need not depend upon an intimate relation with other specialties. There were many good reasons for group association governed by local conditions. Any group which could thereby render greater service than by individual effort was not to be criticized. He deplored, however, an association or grouping of physicians, which might have a combined fee. Gastroenterologists did that part of general medicine which fell to their inclination. He believed their most important work was in the proper application of diet.

Ileocolon Stasis; Its Clinical Consequences and Treatment.—Dr. Sidney K. Simon, of New Orleans, stated that in the treatment of chronic intestinal stasis, first in importance was the diet, next the carrying into execution of a well directed plan of abdominal exercises, which should be insisted upon as a regular routine, twice a day, and persisted in for several months. Pharmaceutical products should be made to play an insignificant rôle. Surgery in refractory cases of long standing had been enthusiastically advocated by Lane, Moynihan and others in England, and by Bainbridge in this country. He believed that this radical plan of procedure should be limited to the cases in which medical treatment had failed.

Congenital Syphilis.—Dr. Stewart H. Welch, of Birmingham, Ala., said that the present laboratory procedures were inadequate. Further progress apparently depended on more reliable laboratory assistance. Therapeutically, congenital syphilis demanded the same consideration given to acquired syphilis. The practice of intelligent obstetrics was important in the minimizing of irreparable damages, the subsequent treatment, and the possible prevention of congenital syphilis.

Vaccines in the Treatment of the Secondary Infection in Pulmonary Tuberculosis.—Dr. C. H. Cooke, of Asheville, N. C., said that autogenous vaccines should never be used in pulmonary tuberculosis as a routine measure. They were of very limited value and should be administered only in selected cases free from demonstrable foci of infection which had been sufficiently studied to warrant the attempt at specific therapy because of failure of the usual routine conservative measures. They should never be used to the exclusion of these measures, and if reliance was put upon them without regard to more essential matters, a great deal of damage would result. The dose should be carefully calculated and an attempt at a general reaction of serious nature should not be made. Persistence in their use after a fair and honest trial in the individual case without improvement on the patient's part should be sufficient grounds for discontinuance.

Sugar Findings in Normal and Pathological Spinal Fluids.—Dr. A. G. Kelley, of Atlanta, Ga., stated that the sugar content of cerebrospinal fluid was decreased in untreated cases of syphilis of the nervous system, in meningitis due to the meningococcus, the staphylococcus aureus and the pneumococcus, and in moribund cases. As cases of syphilis of the nervous system were treated, the sugar content gradually approached the normal, and on this account repeated estimations of the sugar content of the cerebrospinal fluid in these cases might possibly be of prognostic value. There was sufficient evidence to warrant the opinion that the treponema pallidum when present in the cerebrospinal fluid utilized the sugar normally present in the fluid.

Diagnosis of Abdominal Adhesions.—Dr. C. W. Strickler, of Atlanta, Ga., stated that the majority of these cases were curable if the patients were operated upon by a surgeon who understood the development and rotation of the gut with the abnormalities as described by Huntington, and who made an incision of sufficient length to view his work. He emphasized the fact that the smaller and more or less obscure adhesions gave even more trouble than the large ones. Following surgical procedure the patient should have the care of a competent clinician until health was fully restored. If this could be done in all cases, failures would be conspicuous by their absence, and many of the so-called abdominal invalids would have something worth while done for their relief. The length of time necessary to obtain the desired results depended upon the number of months or years the patient had suffered from the distressing symptoms. In his experience relief had come in some cases within a few weeks, in others of long standing, two years were required for complete restoration to health.

Aplastic Anemia.—Dr. Bryce W. Fontaine, of Memphis, Tenn., said that aplastic anemia, although rare, did occur with sufficient frequency to render difficult its diagnosis from several commoner diseases of the blood and abdominal viscera. No reliance could be placed upon the study of the blood smear alone, for it might resemble one or several of the severe anemias. It was possible to differentiate all the severe anemias—those that were marrow regenerating, those that were nonregenerating, and those that were entirely secondary, as in the cases of cancer of the stomach and cancer of the cecum—by a correlation of all the physical signs, analysis of the gastric contents, quantitative estimation of the bile pigments in the duodenal contents, feces and urine, the bleeding time, the resistance of the red cells to various dilutions of salt solution, the presence of skeined and reticulated cells, when the blood was stained with cresyl blue, the total and differentiated blood count, hemoglobin reading, the color index, the platelet count, x ray study of the stomach and cecum for filling defects, study of the bone marrow obtained by bone puncture, and least important of all, the study of the stained blood smear.

(To be concluded.)

Abstracts from Current Literature

ORTHOPEDIC SURGERY

Open Reduction of Congenital Hip Dislocation.—M. A. Bernstein (*Journal of Bone and Joint Surgery,* July, 1922) says that the difficulty in reducing a congenital dislocation of the hip joint increases with the age of the patient. The chief difficulty in reducing a luxation by the closed method is the inability of passing the head of the femur through the narrow neck of the capsule. This has been recently emphasized by Galloway. When the head is once reduced it can be retained by the usual method. In older individuals the depth of the acetabular cavity and shape of the head of the femur are not the chief considerations for a successful reduction. Shortness of the soft structure, muscles, nerves, and bloodvessels are great obstacles. At the age of fifteen or twenty, the muscles, nerves, and bloodvessels have become normal for that individual, and to overcome shortening of four or five inches is a great task. It is therefore necessary to sacrifice muscular attachments. In performing this operation one should first inject the sacral canal to overcome the distressing pain from nerve stretching. One must also take particular care not to injure the bloodvessels. In the case reported there was no evidence of circulatory disturbance.

Congenital Dislocation of Hip.—E. Laming Evans (*British Journal of Surgery,* July, 1922), from a study of forty-nine cases of congenital hip dislocation, gives the following summary: 1. Concentric reductions without any changes in head and neck are good. 2. Concentric reductions with changes in head and neck vary; some are good, others fair. I have to record one bad result in this class—an ankylosis in external rotation and abduction with coxa vara of 90 degrees. 3. Exentric reductions depend upon the degree of absorption. Three cases show good functional results and two fair. It is still too early to say whether progressive arthritic changes will not vitiate these early satisfactory results. He is not optimistic on this point. 4. Anterior transpositions give good functional results as a rule. 5. Posterior redislocations are indistinguishable from untreated cases. Evans's method of reduction was founded upon Lorenz's technic: gradually forces were diminished and muscles spared, so that his later cases were reduced by a much more gentle and less disruptive process than the earlier ones. Except in a few cases where he used internal rotation after Lange's method of retention, he has employed a short spica reaching from the waist to above the knee. Early locomotion on a high patten has been adopted. In bilateral cases the period of retention in plaster has been shortened as much as possible—from three to six months. In unilateral cases he has kept up retention for much longer than is usually accepted—eighteen months to two years. With few exceptions retention has been maintained in 90 degrees flexion, 70 degrees abduction, and an indifferent rotation. Werndorff's axillary abduction has promoted successful retention in difficult cases where the acetabular roof has been markedly deficient. After removal of the plaster, abduction in walking has been secured by applying an inch and a half patten to the sound side. He attaches great importance to a plaster bed made according to the formula 90, 70, 0, up to the end of the third year after successful retention. In unilateral cases one hip only has been enclosed in the plaster. Exceptional cases have been treated with modifications according to the structure and stability of the joint; but, in general, the above may be taken as routine. He has fractured some necks, but no femoral shafts: has had no nervous or arteriovenous complications. There has been one tragedy—the death of a patient, eight and a half years after reduction, from double pneumonia, without a postmortem examination.

Synovial Membrane Joint Tumors.—F. W. Hartman (*Surgery, Gynecology, and Obstetrics,* February, 1922) states that the occurrence of this tumor in joints, and especially in the knee joint, raises at once the problem of saving the limb and function of the joint. Their development is slow as a rule and ample warning is always given in the form of pain, swelling, and interference with function. They are readily removed, if attacked in the early pedunculated stage, without danger of local recurrence or remote metastases. As to classification, it seems best to place them with the benign tumors of connective tissue origin since the giant cells are of the foreign body type and no mitosis is seen. However, there is a potential malignancy, as demonstrated in the patients of Lejars and Rubens, of Kruger and of Garre. Palliative measures and incomplete excision are contraindicated and are perhaps responsible for the malignant characteristics developed in these cases. These neoplasms should not be termed sarcoma, at least until evidences of malignancy are seen either clinically or pathologically. Since any one of the characteristic cells, namely xanthoma or foam cells, pigmented cells and giant cells, may be absent from an otherwise typical case, the writer prefers the name used by Woodhead, namely, myeloid tumor.

Treatment of Chronic Synovitis of the Knee Joint.—G. Gelston Atkins (*British Medical Journal,* June 17, 1922) finds that a strain of the internal lateral ligament of the knee joint causing an effusion into the joint is a common injury. As a result of such an injury the vastus internus muscle is thrown out of action, causing it to lose its tone and waste rapidly. By treatment the effusion is got rid of, but owing to the weakened condition of the vastus internus muscle, any small twist of the joint again strains the knee with the result that more fluid accumulates and the vastus internus is weakened more, thus establishing a vicious circle. This condition may be effectively treated by reeducation of the vastus internus muscle by causing the patient to keep his leg perfectly straight and to practice daily the bracing up of the vastus internus; with severe wasting, an artificial stimulus, like the Bristow coil, is advised. The thigh muscles are massaged and subjected to contrast baths of hot and cold water. The effusion is got rid of by increasing the blood supply around the joint. The patient is allowed light exercise and is instructed not to walk over uneven ground. A tight bandage over wool may be applied to the joint at night. In some cases the fluid must be aspirated.

Treatment of Traumatic Synovitis.—C. A. McWilliams (*Annals of Surgery,* December, 1922) asserts that repeated aspirations combined with active (never passive) motions, and walking without splints afford the best method of treatment of acute and chronic, traumatic, joint synovitis, provided there be no joint mouse nor dislocated meniscus present. Aspiration should be immediately performed in all types of traumatic joint effusions as it relieves pain immediately, renders a correct diagnosis more certain, prevents stretching of the ligaments with their consequent weakening, and avoids subsequent muscular atrophy. Such treatment makes unnecessary all other subsequent physiotherapeutic measures, hence its simplicity makes it applicable to all classes of patients. Such a method of treatment produces a more perfect cure in half the time that is required by the old immobilization method. To leave fluid in a knee, the result of trauma, is just as irrational as to leave fluid in a chest unaspirated. Aspiration of a knee is a simpler procedure and less dangerous than aspiration of a chest, and can safely be performed in a doctor's office or a dispensary, and the patient thereafter can be immediately sent home walking. The effects of physiotherapeutical measures have been overestimated, being used empirically and without foundation. They are makeshifts to excuse procrastination in not applying a radical, curative procedure such as aspiration.

Pseudocoxalgia.—H. Platt (*British Journal of Surgery,* January, 1922) gives the following summary of pseudocoxalgia: 1. Pseudocoxalgia or osteochondritis deformans juvenilis coxæ is a definite entity representing the reaction of the metaphyseal region of the upper end of the femur to the stimulus of an infective agent of attenuated virulence. 2. The condition is comparable with the arthritis deformans juvenilis coxæ which is seen solely in adolescents, and which represents at this age period the reaction of the hip joint to an infective agent of a similar type. 3. The whole cycle of radiographic changes is peculiar to pseudocoxalgia alone. They precede and outlast the clinical phenomena. The final picture is dominated by the deformation of the head of the femur, which is enlarged and flattened. The acetabulum in its final form can no longer contain the whole of the expanded head. 4. Deformation of the head of the femur with flattening and expansion is seen also in conditions distinct from pseudocoxalgia during childhood. There is no evidence to show that in these conditions the typical structural osseous changes of pseudocoxalgia have preceded the stage of flattening. At certain stages the clinical and radiographic pictures of the two groups of affections may show considerable resemblance. This applies particularly to cases of primary tuberculous osteomyelitis of the femoral neck. 5. In the conditions known as tarsal scaphoiditis (Köhler's disease), and apophysitis of the tibial tubercle (Osgood-Schlatter disease), bony changes parallel to those in pseudocoxalgia are found. 6. Conservative treatment directed towards the elimination of weight bearing has no proved influence on the train of morbid changes, but its application is indicated during the stage of prominent symptoms. Operative treatment directed towards the removal of the dominant lesion has no present place in the therapeutics of this disease.

Treatment of Osteomyelitis.—Max Thorek (*Annals of Surgery,* January, 1923) in describing the use of aluminum potassium nitrate in the treatment of suppurative conditions particularly osteomyelitis, states that the treatment is not in any degree a substitute for rational surgery, but must be considered as a preoperative treatment in badly infected cases, enabling the surgeon to later work under more favorable conditions. As a postoperative treatment in infected cases irrespective of whether the case was previously or subsequently infected. As a procedure in those cases that have failed to respond to previous surgical measures and those patients who persistently decline operation. Removal of sequestræ is in all cases advisable. The aluminum potassium nitrate compound is not an antiseptic, but, on the other hand, is a definite accelerator of bacterial growth, tending by rapid propagation to lower the vitality of the infecting organisms thereby assisting the normal resisting powers of the body to eliminate the invading organism. Unlike most antiseptics, the aluminum potassium nitrate compound does not attack normal tissues and does not interfere with granulation or the osteogenetic efforts of nature. Pain, which in most cases is the result of infiltration and consequent tension, is very quickly relieved, due to prompt autolysis and liquefaction relieving tension by absorptive elimination through sinus or systemic absorption. Over seventy-five per cent. of our cases become ambulatory and are able to pursue their vocations, coming to the clinic for dressings in contrast to the radical surgical procedures of the past, thus eliminating long hospitalization and later invalidism with its attendant expense. The method is relatively simple, may be used within wide limits, and employs a nontoxic medicament.

Osteitis Fibrosa. — Young and Cooperman (*Annals of Surgery,* February, 1922) present a study of Von Recklinghausen's disease with a report of a case presenting multiple cysts and giantcell tumors and conclude that osteitis fibrosa, under which may be included benign bone cysts, giantcell sarcoma of the epulis type, hemorrhagic osteomyelitis and the generalized form (Von Recklinghausen's disease) is a distinct pathological entity characterized by a fibrous metaplasis of bone. Two types of the disease are recognized, a local and a general type. Local osteitis fibrosa and benign bone cysts are dependent upon trauma in a great majority of instances. The general form is dependent upon grave nutritional disturbances. Endocrinal glandular dysfunction, faulty calcium metabolism and chronic infection of a low grade seem to be of etiologic significance. Cysts, osteitis fibrosa cystica and giant cells may occur in the same bone. The giantcell contents is not prognostic of malignancy. Diagnosis of osteitis fibrosa is based upon the long duration of this process with very vague symptomatology, the frequency of spontaneous fractures and upon x ray examination. Very often microscopic examination of pathological sections is necessary to clear up the diagnosis. The local form of the disease is benefited by curettage and bone transplant. The type showing multiple lesions must be given constitutional treatment directed toward the underlying constitutional disturbance. If the lesions are accessible, curettage and bone transplant may be employed.

A Case of Avulsion of the Tuber Calcanei.—Anton Mülleder (*Wiener klinische Wochenschrift,* July 27, 1922) reports a rare case of avulsion of the tuber calcanei in a man, sixty-one years old, as a result of a fall from a scaffold. The entire foot was swollen and suffused, especially around the heel. About three finger breadths above the edge of the os calcis, a sharp spicule of bone was felt almost piercing the skin. The röntgenogram revealed an avulsion fracture of the tuberosity of the os calcis and dislocation of the proximal fragment upward, with a constant contraction of the tendo Achilles. At operation, a hematoma cavity as large as a child's fist was found and the broken off piece of bone was drawn upward and medially and turned about ninety degrees. On extending the foot, the fragment could be replaced and it was sutured in place with silk ligatures, including the insertion of the plantar fascia, the periosteum and the insertion of the tendo Achillis. A cast was applied to the foot in extension. Recovery followed but the patient was hindered considerably from walking, especially for any length of time. This is the usual result. The question whether such fractures result from direct or indirect injury is undecided, although the author believes that in this case the cause of the fracture was direct injury, aided by the arrangement of the bone trabeculæ and the abnormal tension on the musculature. Most surgeons favor a conservative therapy, but if this fails surgery is indicated. In this case conservative therapy was contraindicated because of the torsion of the fragment and the threatened perforation of the skin. The author favors radical treatment together with a simultaneous tenotomy.

Rheumatoid Arthritis and Its Practical Treatment.—Leonard Dobson (*West London Medical Journal,* October, 1922) thus summarizes his paper: In all cases of arthritis make a thorough examination to see whether one has to deal with a direct specific infection, such as syphilis, tubercle, gonorrhea, or the like, including an examination of the blood, feces and urine. Do not, because you obtain a positive Wassermann, at once come to the conclusion that you have only syphilis to deal with. If there is much pain and inflammation it is possible that there may be another cause. Failing these make a thorough search for some focus of sepsis either in the mouth, nasopharynx, alimentary canal, bladder or uterus and its appendages, or other parts of the body. Do not if you see pus oozing from the margins of the gums, at once decide that this is the sole cause of the trouble and order all the teeth to be removed. It may not be of any service, and few artificial dentures are a really satisfactory substitute for the natural teeth. At the same time all really diseased stumps should be extracted. If the urine or feces give positive evidence of the presence of microorganisms which are likely to cause trouble, let an autogenous vaccine be prepared and administered, but do not rely entirely on this. Similarly, if the urine shows the presence of products of intestinal putrefaction, such as indican, indol and skatol, subject the patient to a thorough course of intestinal lavage daily for a period of three weeks, then every other day for a similar period, and finally once a week. At the same time give a morning dose of half an ounce of paraffin and an aloin and belladonna pill in the evening. Place a blister two inches square over the seventh and eighth cervical and tenth to twelfth dorsal vertebræ, and keep these open by dressing daily with savin ointment. Treat all acutely inflamed joints by means of rest, heat baths, suitable splints, and bandaging. Chronic swelling is best treated with hot air baths, Scott's dressing, occasional blisters, Bier's congestive treatment, and the other means already described. Finally, when the disease seems to have come to an end, encourage movement by exercises, massage and manipulations.

Paget's Disease.—P. Lewin (*Journal of Bone and Joint Surgery,* January, 1922) includes a report of three cases in his study and gives the following treatment. Preventive treatment is impossible because of the difficulty of diagnosis before deformity has set in. Curative treatment at present is impossible. Corrective treatment may be inadvisable because of the age of the patient and the probability of failure. Funk hopes to offer something of value in the treatment from the standard of calcium metabolism. Arsenic has been given internally in all its forms, and the results are questionable. There have been recommended by various authors prepared bone marrow, codliver oil, calcium lactate, thymus gland. One writer recommended giving proteins, but no carbohydrate. For the present it seems that the best hope is offered by the administration of phosphorus internally; for example, in the phosphorus pill of a hundredth of a grain three times a day, continued over a long period. Goldthwait, Painter, and Osgood reported a case in which the patient suffered a fracture of the affected thigh from a severe trauma. The broken bone healed with apparently normal rapidity and firmness. This encouraged them to recommend osteotomies for the correction of marked but slowly developing deformities, especially of the lower limbs.

Fracture of the Spine.—W. J. Mixter (*Journal of Bone and Joint Surgery,* January, 1923) says that many fracture crushes of the spine, without cord involvement, are unrecognized. A great many physicians think that if a man can walk he has not fractured his spine, and treat him for sprains and contusions of the soft parts. The majority of fracture crushes of the spine receive no adequate treatment. They are allowed up after periods of from one to eight weeks in bed without any support and gradually break down and deform. It is highly essential, no matter how long patient has been in bed, that he have adequate support in order to restore, partially at least, the normal function of the spine, while at the same time preventing the occurrence of deformity until the return of full function is permissible. We have found that the spinous processes of the fractured vertebræ will be tender until the healing of the vertebra has taken place and all strain has been taken from it. It is very easy to fracture a vertebra if weight is applied to the top of a slightly flexed spine. All cases of fractured spine should be corrected and put in the best position and then held in that position until Nature has repaired it. This should be at least six months. It is unnecessary to do any operation on the spine for internal fixation. Every case of suspected fracture of the spine should have a thorough x ray examination, and that means plates taken anteroposteriorly and laterally.

Bone Grafting as an Aid in Treatment of Tuberculous Spinous Caries.—Henry W. M. Gray (*British Medical Journal*, July 15, 1922) believes that bridging the tips of the spinous processes of the vertebræ, as is done in the Albee operation, does not give sufficient fixation, as a certain amount of give in the spinous processes and grafts is necessary, especially in the dorsal region of the spine, which is the part of the spine most often affected by the disease. The fixation is uncertain because the graft is inserted at quite a distance from the articular processes and the intervertebral discs, where motion takes place and the unsatisfactory results often seen are due to the inadequate fixation, especially in the younger children. In the more recent method of Hibbs, the fixation is better but the operation is complicated and severe and is usually not as successful as the author's operation. This consists of placing tibial transplants into grooves made in the spine. The periosteum of the spinous processes and laminæ is reflected, the exposed bone is roughened with a chisel and the grafts are placed with the periosteum outermost. The edges of the aponeuroses are approximated across the midline with catgut sutures and the wound is closed without drainage.

Osteitis Deformans.—Sydney M. Cole (*Journal of Bone and Joint Surgery*, October, 1922), from a study of Paget's disease, concludes as follows: There is osteoporosis with disappearance of bone by lacunar absorption and chemical (vital fluid?) dissolution, accompanied by new formation of bone. In the author's case the new formation is not so marked as in those reported by others. The active process seems to have been completed. There is evidence of breaking down of bone—he would say bending of trabeculæ crushing down on neighboring cancelli, obliterating some canals and assisting in the formation of others. There is marked vascular degeneration with varicose vessels, thrombosis, congestion, leakage with edema and minute hemorrhages. The surrounding tissues are modified to a certain extent as evidenced by changes in vessels, nerves, muscles, and tendons. It is suggested that this is due to the bone absorption in their neighborhood throwing them in contact with unaccustomed (unusual) neighboring material. In the case of muscle attachments the distortion and microscopical changes are especially marked. The bone itself shows reversion to a fibrous type in places; there is a metaplasia to myxomatous tissue and the marrow is myxomatous, fibrous or cellular, the bone cells taking part in the process. There is what appears as a reversion of marrow in some bones to the embryonal type—containing small and large round cells, megalokaryocytes and normoblasts—possibly compensatory. The bone cell multiplication is an essential part of the disease. The pathological changes vary in the different bones and in various parts of the same bone. This will be noted, too, in the appended pathological reports of various cases by different workers. There is evidence of analogous conditions to bone in the organs and tissues (see kidney, spleen, muscle), and nerves. This is best noted in the tendency to overgrowth cell multiplication. The circulation has been erratic for years with intermittent compensation and the reverse, the bones, organs, and soft parts being correspondingly affected. The changes involved correspond to what one finds in chronic inflammation or in resolution of acute inflammation where repair is the most important factor. His impression is that there is a primary bloodvessel pathology like one sees in syphilis, hereditary or acquired, with accompanying bone changes, such as one finds on a small scale in chronic passive congestion or infections of a chronic character. It is not at all improbable that malaria, typhoid, influenza, erysipelas, or parasitic germs could produce such vascular lesions, accompanied by local and general osteitis deformans.

Treatment of Fractures.—T. S. Mebane (*Military Surgeon*, August, 1922) concludes that all fractures should be splinted before transportation. For this purpose, except under war conditions, coaptation splints, Thomas or Keller leg splint, and Cabot posterior wire splint, are the splints usually required. Many compound fractures can be converted into simple fractures by prompt application of iodine and a sterile dressing. Where considerable laceration of the soft parts has occurred, débridement with primary or secondary closure should be practised. Infected compound fracture should be treated by Carrel-Dakin technic with suspension in Balkan frame and traction to preserve alignment. Simple fractures and compound fractures present differences which require that they be handled differently. Convalescence in fracture cases can be shortened and function conserved by employment of physiotherapeutic measures, early use of the part, and employment of braces and supports until callus becomes firm.

New Plaster Shell in Pott's Disease.—R. Plato Schwartz (*Journal of Bone and Joint Surgery*, October, 1922) summarizes as follows: 1. The defects of the old shell have been revealed and it has been made a practical instrument through which the fundamental principles of therapy may be applied in the treatment of Pott's disease. 2. X ray controls are necessary to prove its efficiency. 3. The fulcrum should not be placed opposite the apex of the kyphos except in the region of the seventh dorsal vertebra. 4. In lesions above the seventh dorsal vertebra the fulcrum should be made below the apex of the kyphos, quarter of an inch for each vertebra above this level. 5. In lesions below the eighth dorsal the fulcrum should be made above the apex of the kyphos, approximately quarter of an inch for each vertebra below this level. 6.The new shell with an adjustable fulcrum has thus far, in a limited number of cases, overcome the defects of the old one. It is much more comfortable for the patient, easier to handle, and much less expensive; besides being fully practical for treatment in the home and out patient department.

Ligation for Aneurysm.—C. Balance (*British Journal of Surgery*, January, 1922) concludes that cases about to be submitted to operation should not be previously treated by the method of Valsalva; that there is a group of cases of aneurysm of the innominate artery (aneurysm of the bifurcation) suitable for proximal ligature. Distal ligature causes the aneurysm to become a diverticulum of the aorta, and so increases the pressure within it, and should not be done when proximal ligature is possible. The presence of the aneurysm necessitates removal of a part of the sternum in order to gain a free and clear exposure of the vessel below the aneurysm.

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Tendon Transplantation.—Robert Ollerenshaw (*British Medical Journal,* July 15, 1922) states that the transference of muscle power may be used, 1, to restore loss of motion from injury of the peripheral nerve, as in poliomyelitis; 2, to redistribute the power acting about a joint; and 3, to diminish the unopposed action of nonparalyzed muscles which cause a deformity. Tendon transplantation should not be undertaken until the full extent of the amount of paralysis is positively determined. Constant splinting and physiotherapy must be given a sufficient trial. The transplantation does not produce an increase of muscular power but the power is more usefully distributed. The operation is chiefly indicated when the paralysis is limited to a group of muscles and where other muscles (not antagonistic) are available for transplantation. Around the ankle, only a redistribution of power can be expected. The simple flexion and extension movements of the ankle should be retained and the subastragaloid joints should be fixed by arthrodesis. The technic includes the correction of all deformities. Secondary changes in the bones and joints may require wrenching and fixation in the overcorrected position for a time. The skin in the field of operation is carefully prepared for operation for three days and the strictest asepsis must be maintained. The best results are obtained with the transplantation of the entire tendon (not slips of tendons) which is fixed as close to the insertion of the paralyzed tendon as possible, best by suture. If the transplant is too short, the paralyzed tendon is buttonholed and the transplant is passed through and firmly sutured to it. The transplanted tendon should run in as straight a line as possible. The limb is then fixed so as to secure as much relaxation of the transplanted tendon as possible without producing strain on the sutures. The aftertreatment consists of complete fixation for six to eight weeks, at which time removable supports are provided. The reeducation of the muscles is aided by physiotherapy.

Injection of Oxygen in Joints for Diagnosis.—S. Kleinberg (*American Journal of Surgery,* September, 1921) says that when he first began his work with the injection of oxygen into joints he was hopeful that this method would enable him to outline loose or injured semilunar cartilages. In this he had been unsuccessful, although on one occasion shadows were obtained which appeared logically to outline these structures. However, in reviewing his experiences he believed that there was no doubt that the injection of oxygen into joints for röntgenography had many advantages and was a great aid in diagnosis. Primarily it accentuates the contrast between the soft parts and bones, and brings into relief soft structures that are not discernible in the ordinary röntgenograms. It is very useful in demonstrating loose bodies in joints, and it is invaluable in locating them. It is helpful also in showing the presence and extent of hypertrophied synovial tissue.

Treatment of Scoliosis.—A. M. Forbes (*Journal of Bone and Joint Surgery,* July, 1922) gives the following summary as the result of his surgical treatment of scoliosis. Although operative procedures for scoliosis cannot be considered to have stood the test of time, they have been sufficiently encouraging to permit us to continue their employment. We have never operated for cosmetic effects and we have purposely operated only in a limited number of patients under the conditions already mentioned. We hope that the day will come when the field of usefulness of operative procedures may be extended, but we would hesitate to recommend their general use, because, as we have already stated, the operation is a severe one. It should not be carried out except after deep thought and consideration, and then only by those who are accustomed to operate on the spine. Perhaps at a later date its field of usefulness will be broadened, but until we have been able to prove the enduring character of the ankylosis and the general benefit to the patient we have no right to employ it except in desperate cases.

Cervical Rib.—S. W. Boorstein (*Journal of Bone and Joint Surgery,* October, 1922), from a study of six cases which he reports, concludes that many cases coming to the orthopedic surgeon with shoulder trouble may be due to cervical rib. Cases presenting the following symptoms: pain, especially on motion, cyanosis, and atrophy of the limb, and no limitation of motion, should make one suspicious of a cervical rib. The fullness of the supraclavicular fossa, besides the x ray, should help in the diagnosis. The removal of the rib should be practised by the orthopedic surgeon for the same reason that he removes the transverse process of last lumbar. Where symptoms have existed over a long period, and especially where paralysis and atrophy form part of the picture, removal of the rib will stop the progressive increase of the symptoms, but may not result in the entire recovery of what has already been lost. This indicates the necessity for early diagnosis, and the desirability of good stereoradiographs of the neck in every case of persisting pain or lameness of obscure origin. In all cases of shoulder trouble, x ray of cervical spine should be taken, since, if the cervical rib may not be the sole cause, it may be a contributory cause by interference with the circulation and nerve supply.

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Theories and Theorizers Connected with the Development of the Laws of Heredity*

By J. ARTHUR BUCHANAN, M.D.,
Rochester, Minnesota,
Fellow in Medicine, The Mayo Foundation.

As the problems of heredity have been solved in conjunction with the studies of cellular life, the development of the theory of heredity may be divided into two quite distinct periods: 1, the precellular period (? B. C. to 1838 A. D.), and, 2, the cellular period (1838 to the present era).

THE PRECELLULAR PERIOD.

The precellular theory of heredity dates far back in the history of man, and as the theories of the early periods were largely speculative, those on heredity naturally fell into the same category. The speculations, however, often harmonize quite well with our present interpretations of definite facts. This fact is particularly exemplified by the works of Empedocles of Agrigentum (495-435 B. C.), who said, "Living beings are derived from the growing together of incomplete structures and separate members whereby only intrinsically congruous combinations are capable of existing and of being propagated." The diseed origin of man had been expressed more than a thousand years previously by Moses, who, in depicting the origin of the universe, records the first punishment by these words, "And I will put enmity between thee and the woman, and between thy seed and her seed." It seems remarkable that it took so many years before the seeds were discovered as concrete entities.

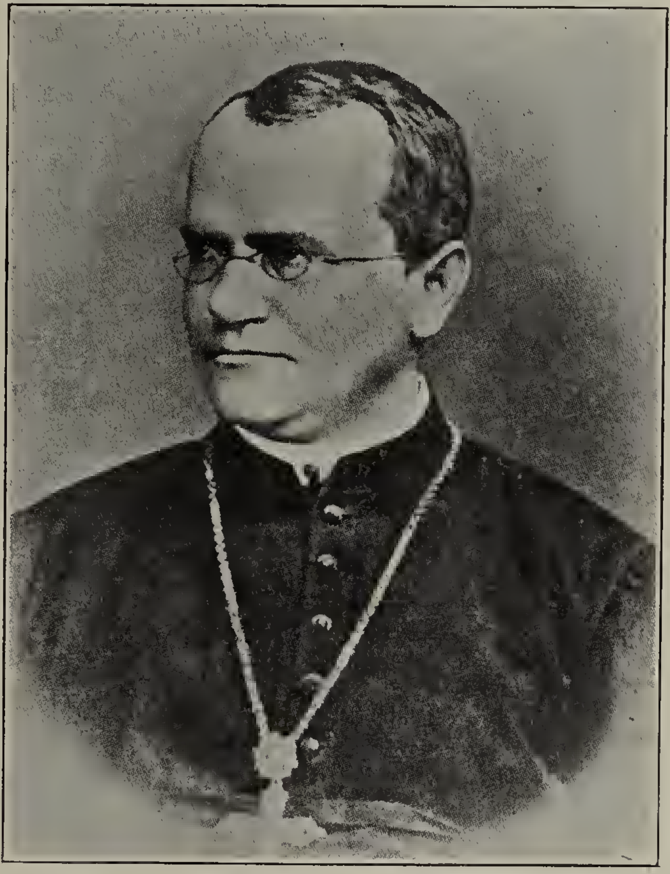

Fig. 1. Gregor Mendel as Prälat.

One is led to suspect that among the early thinkers there was current a belief that animal life developed from decomposing matter, since Pythagoras of Samos denied such a theory in his writings, and asserted the necessary existence of an embryo.

The genetic state of knowledge in the fourth century is well illustrated in a statement by Aristotle (384-322 B. C.), concerning the advancement of learning, "I found no basis prepared, no models to copy. . . . Mine is the first step, and, therefore, a small one, though worked out with much thought and hard labor." Aristotle was the first to conceive of a genetic series, and his conception of a single chain of evolution from polyps to man was never fully replaced until the beginning of this century. He perceived the forces of prepotency, and of atavism or reversion. Of prepotency, he said, "Children resemble their parents not only in congenital characters, but in those acquired later in life. For cases are known where parents have been marked by scars, and children have shown traces of these scars at the same points. A case is reported from Chalcedon in which a father had been branded with a letter, and the same letter somewhat blurred and not sharply defined appeared upon the arm of his child." This idea marks the beginning of the prolonged argument concerning the inheritance of mutilations or acquired characters. Aristotle, however, had evidently imag-

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ined the elements of the theory later advanced and known as pangenesis, since he expressed disbelief in the possibility of such a mechanism. He did not believe in the inheritance of normal functional modifications.

Theory of telegony.—The fanciful ideas of early observers in heredity are expressed in the theory of telegony, or impregnation. This was formulated about 1530 as a result of observations made by Fouilloux, who believed that a bitch always gave birth to pups that bore characters of the first dog with which she had been crossed. The same phenomenon has been reported in man, but such observations have not been authenticated. Darwin and Spencer both reported instances of what they considered telegony. The theoretical explanation of the occurrence was based on the belief that the first male made a profound impression of a nervous nature on the unformed or forming cells of the ovary, so that all subsequent offspring were affected. The theory of impregnation of an ovum while still in the ovary was advanced; while in the uterus the first fetus was also believed to produce a lasting influence on all later formed ova. The theory of telegony still has its exponents, and as late as 1921 was of sufficient interest to attract the attention of the French Academy. The review at that time, however, was more patriotic and nationalistic than scientific, as the theory has been demonstrated by many investigators to be entirely false.

The theory of epigenesis.—The first really distinct theory of heredity was that of epigenesis, advanced by Malpighi and Leeuwenhoek in the seventeenth century. Malpighi's observations were made on the unincubated egg in the heat of the Italian summer, and the eggs may have reached a fairly advanced stage of development before they were opened. Malpighi wrote, "Frequently I opened the sac with the point of a needle, so that the animals contained within might be brought to the light, nevertheless to no purpose; for the individuals were so jellylike and so very small that they were lacerated by a light stroke. Therefore, it is right to confess that the beginnings of the chick preexist in the egg; and have reached a higher development in no other way than in the eggs of plants." He believed that the elements of the germ cells were gathered from all parts of the body, and he adumbrated Darwin's theory of pangenesis. Malpighi clearly perceived the struggle for existence and the survival of the fittest.

The theory of epigenesis was correlated by Swammerdam, and published by Boerhaave in *Biblia Naturae,* in 1737. Swammerdam had observed that the parts of butterflies and other insects are discernible at a very early stage. While observing caterpillars just before pupation, he saw in outline the organs of a future stage, and naturally concluded that development consists of an expansion of already formed parts.

The theory of epigenesis became further complicated about 1677 when Leeuwenhoek discovered the fertilizing filaments of the human ovum. Priority in this discovery has also been claimed by Hamm and by Hartsoeker. Leeuwenhoek, Hartsoeker, and others looked on the egg simply as a nidus within which the sperm developed, and they asserted that the future animal existed in miniature in the sperm (Fig. 3). These controversies gave rise to the schools of the spermatists, who believed the sperm to be the animal germ, and of the ovists, who contended that rôle for the ovum.

Fig. 2.—August Weismann, 1834-1914.

The theory of preformation or encasement.—These speculations led to another aspect of epigenesis. Swammerdam, Leibnitz, and Bonnet thought that if the animal germ existed preformed, many generations must be encased within one germ. This gave rise to the fanciful idea of encasement or emboitement (Fig. 3), which was so greatly elaborated by Bonnet, and by Leibnitz who applied it to the development of the soul. Even Swammerdam conceived of the germs of all forthcoming generations as having been located in the common mother Eve, closely incased one within the other.

The controversies concerning the relative merits and demerits of the ovum attracted the attention of Harvey, who expressed, in his dissertation, *On generation,* in 1651, a quaint conception of the function of the ovum. He said, "The egg is the midpassage or transition stage between parents and offspring, between those who are or were, and those who are about to be; it is the hinge or pivot upon which the whole generation of the bird revolves. The egg is the terminus from which all fowls, male and female, have sprung, and to which all their lives tend. It is the result which Nature has proposed to herself in their being, and thus it comes that individuals in procreating their like for the sake of their species endure forever. The egg, I say, is a period or portion of this eternity.

The theory of preformation and encasement met its first bitter opponent in Wolf, in 1759, in his *Theoria Generationis.* He contended that the organs of animals made their appearance gradually, and that he could actually follow their successive stages of formation. He assumed a total lack of organization in the beginning, and was obliged to make development miraculous through the action on the egg of a hyperphysical agent or *vis essentialis corporis.*

The theory of transformism.—The theory of transformism, advanced by de Maupertius (1698-1759), was based on the idea that all material particles of living matter are in some degree invested with physical properties of the higher organism. This idea was later accepted by Haeckel, and forms the basis of his monistic system of philosophy. With regard to the theory of heredity, de Maupertius said, "The elementary particles which form the embryo are each drawn from the corresponding structure in the parent, and conserve a sort of recollection of their previous form, so that in the offspring they will reflect and reproduce a resemblance to the parents. If some of the particles happen to be missing, an imperfect being is formed; . . . if the elements of the different species are united, a hybrid is produced; . . . in some cases a child resembles one of his ancestors even more than its parents; in this case we may suppose that the material particles conserve more strongly the habits they possessed in the ancestral form." This idea permeates the theory of Weismann, which is the fundamental basis of the modern chromosome theory of heredity.

Environment.—The relation of environment to the mutability of species was first generalized by Buffon (1707-1788). In his *Histoire Naturelle,* he said, "In animals, species are separated by a gap which Nature cannot bridge over . . . we see him, the creator, dictating his simple but beautiful laws and impressing upon each species its immutable characters." In 1761 he said, "How many species, being perfected or degenerated by the great changes in land and sea, by the favors or disfavors of Nature, by food, by the prolonged influence of climate, contrary or favorable, are no longer what they formerly were." Later, he said, "One is surprised at the rapidity with which species vary, and the facility with which they lose their primitive characteristics in assuming new forms." In this contradictory manner a field was opened which has always been the arena for debate concerning the influence of environment on hereditary characteristics.

PHILOSOPHICAL TREND.

An excellent illustration of the philosophical trend of investigators in the eighteenth century is contained in the writings of Diderot (1713-1784), in honor of whom the school of philosophy, Langres, France, is named. In discussing the origin of man, he said, "Even if Revelation teaches us that species left the hand of the creator as they now are, the philosopher who gives himself up to conjecture comes to the conclusion that life has always had its elements scattered in the mass of inorganic matter; that it finally came about that these elements united; that the embryo formed of this union has passed through an infinitude of organization and development; that it has acquired in succession, movement, sensation, ideas, thought, reflection, conscience, emotions, signs, gestures, articulation, language, laws, and finally the sciences and arts; that millions of years have elapsed during each of these phases of development, and that there are still new developments to be taken which are as yet unknown to us."

Experimental era.—The experimental period in the study of heredity commenced with Kölreuter (1732-1806), who was the pioneer student of hybrids. He was the first to carry out a series of systematic experiments on plant hybridization, in 1760 to 1766. These experiments not only established with certainty for the first time the fact that the seeds of plants are produced by sexual processes comparable with those known to occur in animals, but also led to a knowledge of the general behavior of hybrid plants, which are scarcely bettered until Mendel made his observations. Kölreuter found that the hybrid offspring of two different plants generally looks as much like the plant which yields the pollen as like that on which the actual hybrid seed is borne. He found that it makes little or no difference in the appearance of the hybrid which of the parental species is the pollen parent (male) and which the seed parent (female); that is, in plants, the result of reciprocal crosses is usually identical. Thus, for the first time, it was definitely shown that the pollen grain plays just as important a part in determining the characters of the offspring as does the ovule which the pollen grain fertilizes. This marked the end of the schools of spermatists and ovists. Kölreuter had no means of discovering that the contents of a single pollen grain unite with the contents of a single ovule in fertilization. He believed that the act of fertilization consisted in the intimate mingling of two fluids, the one contained in the pollen grain and the other secreted by the stigma of the plant. The mingled fluids, he supposed, next passed down the style into the ovary of the plant and, arriving at the unripe ovules, initiated those processes which led to the formation of seeds.

Kölreuter was not aware of the existence of any natural wild hybrid plants. He produced the first artificially bred hybrid in 1760 by applying the pollen of Nicotiana poniculata to the stigma of Nicotiana rustica. The stamens and pollen grains of the hybrid were so poor as often to reach the point of sterility. He backcrossed hybrid with parent until it was impossible to distinguish their respective origins.

While Kölreuter was carrying out his experiments, Lamarck, a philosopher of the French school, was introducing a phase of heredity which was then, as now, the subject of many debates. Lamarck (1744-1829), in spite of being physically incapacitated by blindness, added much to biological knowledge and is especially noted for his views on acquired characters and on variation. His theory of acquired characters is stated in his second law, which reads, "All that has been acquired or altered in the organization of individuals during their life is preserved by generation and transmitted to new individuals which proceed from those which have undergone these changes. All that Nature has caused individuals to acquire or lose by the influence of environment to which they have been long exposed, and consequently by the influence of the predominant employment of a certain organ, or by that of continued lack of use of some parts. . . . All this Nature conserves by generation to the new individuals which arise, provided that these acquired variations are common to both sexes, or to those which have produced these new individuals."

By experimentation Lamarck brought out the results which follow free intercrossing, showing that according to his theory, the effects of environment would be neutralized in the union of individuals which have been subject to different environments, whereas the crossing of individuals subjected to the same environment would hasten to perpetuate the transmission of similar effects. To this principle he refers the fact that the accidental changes induced by the habits of men are not perpetuated, since they do not occur in both parents, whereas the formation of distinct races in widely different parts of the world is due to the uniformity of their environment.

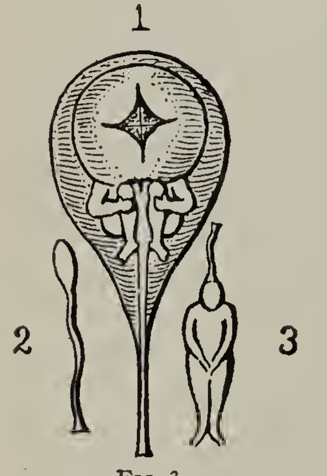

Fig 3.

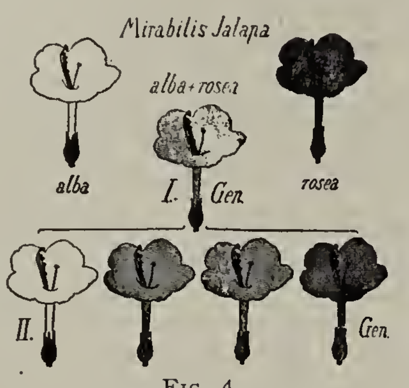

Fig. 4.

Fig. 3.—1, Spermatozoide idea after Hartsoeker. 2, Spermatozoide in envelope stage. 3, Spermatozoide freed from its envelope.

Fig. 4.—A diagram to show inheritance of flower color in crosses of Mirabilis, the "four-o'clock." *Alba*, white parent; *rosea*, red parent; *alba* + *rosea*, the unfixable F_1 heterozygote, of intermediate color, pink. I. Gen. = F_1. II. Gen. = F_2. (After Correns.)

Lamarck will always be remembered for his precipitation of the prolonged discussion concerning variations. He said, "Variations are produced by the use and disuse of organs, by response to external stimuli, and by the direct inheritance of these acquired characters."

It was Lamarck who launched the doctrine of organic evolution, but Darwin connected it with natural selection and, hence, receives all the credit. The basic principle of Lamarck's work is the inheritance of acquired characteristics, and, although this point has been and is still hotly contested, he remains one of the greatest philosophical biologists.

As the tide turned completely away from speculation to experimentation in the study of heredity, Cuvier (1769-1832) came into the breach with a theory of spontaneous generation, the fixity of species, and the preformation of the embryo.

CELLULAR PERIOD (1838 TO PRESENT ERA).

The foremost biological event of the early nineteenth century was the discovery, by Schleidin and Schwann, of the cell in plants and animals. This changed the whole basis of biological philosophy. It is to be remembered, however, that the work of Purkinje, Valentine, John Müller, and Henle had paved the way for this discovery.

The recognition of the cell was soon linked with progress in heredity when von Kölliker (1817-1905), the master zoologist, demonstrated that spermatozoa had their origin in the testicular cells. LaValette St. George (1878) showed that the spermatozoon contains not only a nucleus, as Kölliker believed, but also cytoplasm. Geganbaur (1854) demonstrated that in vertebrate animals the eggs are in reality single cells, regardless of size and condition. In 1875 Hertwig established the all important fact, that fertilization of the egg was accomplished by its union with but a single spermatozoon. Kölliker, although ignorant of Mendel's work, rejected the theory of natural selection in favor of saltatory or spontaneous variations, as he regarded the cell nucleus as the transmitter of hereditary characters. The latter idea bore fruit in the hands of Weismann.

The experimental investigation of heredity on a broad scale was first undertaken by Sir Francis Galton (1871-1897). The theory of pangenesis had been launched by Darwin, and in order to disprove it Galton transfused rabbits with blood from other rabbits, but found that it did not have any effect on the offspring. His observations are now known to mean little, as he did not know the length of life of transfused blood corpuscles (Ashby), nor did he carry the experiments into the second generation. His studies on transfused blood in rabbits, of tricolored spots, of stature, and certain other characters in human families, led him to reject the Lamarckian theory of the inheritance of acquired characters as well as the Darwinian theory of pangenesis. In his book, *Natural Inheritance* (1899), he proceeds to the law of filial regression, by statistical induction, a method introduced into biology in 1845 by the Belgian astronomer, Quetelet. According to this law the offspring of parents unusual in height, talent, and so forth regress to the average of the stock. Galton also formulated the law of ancestral inheritance by virtue of which each parent contributes one fourth of the total inheritance; each of the four grandparents one sixteenth, and each of the eight great grandparents one one hundred and twenty-eighth. The latter theorism has been confirmed, with slight mathematical changes, by the biometrical methods of Pearson.

Galton introduced the doctrine of eugenics (a term of his coinage), founded the Eugenics Laboratory in London (1904), and with Pearson and Weldon founded *Biometrika,* a journal for the study of biological problems by advanced statistical methods.

The statistical work begun by Galton is still going on under the direction of Pearson (1920). Pearson has shown that, in the case of tuberculosis, it is not the disease but the diathesis which is inherited, not the seed but the soil; that the death rate from disease is selective in a large percentage of cases, and that a higher infantile death rate implies the survival of a stronger and more enduring stock. He asserts that the trend of modern medicine to preserve the dis-

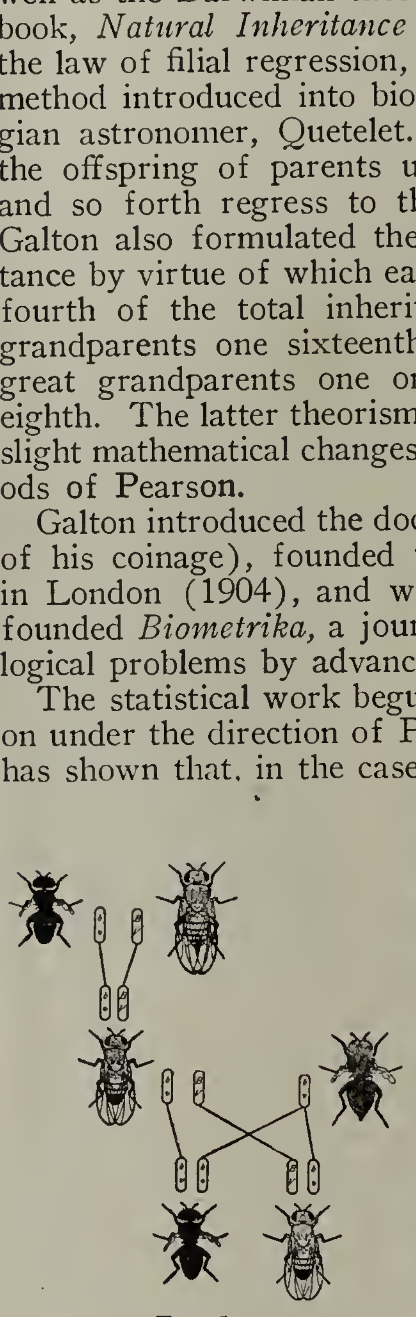

Fig. 5.

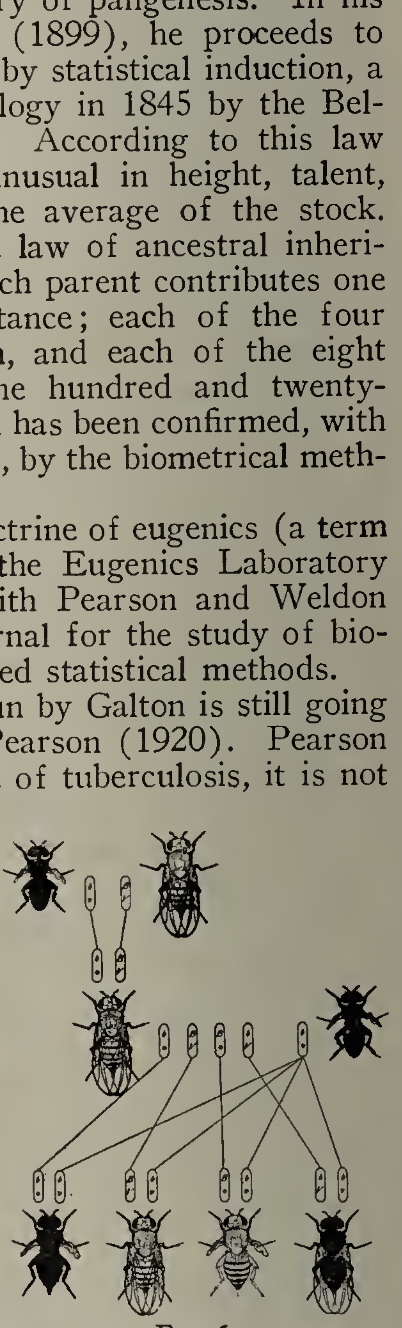

Fig. 6.

Fig. 5.—Backcross of F_1 male (out of black vestigial by wild) to black vestigial (After Morgan).

Fig. 6.—Backcross of F_1 female (out of black vestigial by wild) to black vestigial male (After Morgan).

eased and deformed is not only detrimental to the human species, but can only be obviated by preventing the defective from breeding their kind. He asserts that dark eyed women procreate faster than the light eyed; and the tall faster than the short. He has established the law of assortative mating, by virtue of which human beings mate, not as usually believed, with their opposites in stature, complexion, and so forth, but with their own kind. In this respect he finds husband and wife are more alike than uncle and niece or first cousins.

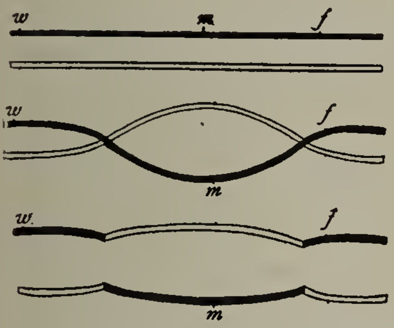

Fig. 7.—Scheme to illustrate double crossing over between white and forked. The gene for miniature standing between furnishes the evidence. (After Morgan.)

In the years immediately preceding the work of Mendel, important studies on the nature of hybrids were made by Naudin (1852). Naudin made a comprehensive survey of the facts of hybridization in plants and almost reached the point of expressing the generalizations which Mendel set forth a few years later. He pointed out the fact, first observed by Kölreuter, that hybrids may be brought back to the form of either parent by repeated crossing with a parent. Naudin supposed that these potentialities might become segregated in the pollen grains and ovules of the hybrid plant. Naudin, however, never conceived of the genetic possibilities of the hybrid character.

A review of the theories of heredity would be very incomplete without a brief study of Mendel. Johann Mendel (Fig. 1) was born July 22, 1822, at Heinsendorf bei Odrau, in the "Kuhland" district of Austrian Silesia. His father, a peasant proprietor with small holdings, took special interest in fruit culture, and initiated Johann at an early age into the methods of grafting. The name Mendel connotes Jewish origin, but it is practically certain that the suggestion is without foundation. The family name appears in the Church Register of the seventeenth century, usually as Mandel, whereas it was not until the reign of Joseph II (1765-1790) that the Jews in Austria assumed definite surnames.

Mendel's maternal uncle conducted private classes for the children of Heinsendorf who could not walk so far as the neighboring village, for in Heinsendorf itself there was at that time no regular school. Mendel later attended a government school established on the death of the uncle. His talent was noticed and encouraged by the master. At this time also two older boys who had gone away to the school at Leipnik fell in with Mendel during their holidays and excited his ambition, with the result that he asked his parents to let him study. When eleven years of age he, too, was sent to Leipnik, although this involved considerable sacrifice on the part of the family. Here he distinguished himself so much that it was decided to continue his education at the gymnasium at Trappou, a course which finished with a year at Olmutz. The parental resources were severely taxed by such expenses, and Mendel was only enabled to complete his course through the generosity of a younger sister who voluntarily contributed a part of her dowry for this purpose. In after years Mendel repaid her advance many times by providing for the education of his three nephews.

At Trappou, one of the teachers was an Augustinian monk, and it has been surmised that perhaps his description of the scholarly tranquillity of the cloister may have turned Mendel's thoughts towards a monastic life. However that may be, when his course at the gymnasium was ended he became a candidate for admission to the Augustinian house of St. Thomas in Brunn, an institution generally spoken of as the Königskloster. His application was successful and he was elected with a view to his taking part in the educational work which then devolved on the institution. On admission, he took the name of Gregor "in religion," Johann being his baptismal name. In 1847 he was ordained a priest.

At the expense of the cloister he was sent, in 1851, to the University of Vienna, where he remained until 1853, studying mathematics, physics, and natural sciences. During this time he published two notes on Scopolia margarilis and Bruchus pici. On his return to Brunn he became a teacher, especially of physics, in the Realschule. He appears to have taken great pleasure in teaching and to have been extraordinarily successful in interesting his pupils in their work. He continued this occupation until 1868, when he was elected Abbot, or more strictly Prälat, of the Königskloster (Fig. 1).

The experiments which have made his name famous throughout the world were carried on in the large garden of the cloister. From the time of his novitiate, he carried on experimental work, introducing various plants into the garden, and watching their behavior. He was very fond of showing his experiments to his friends. Dr. von Niessl relates how on one occasion he was taken to see Ficaria calthaefolia and Ficaria ranunculicides which had for some years been cultivated side by side without manifesting any noticeable change. Mendel jokingly said, "This much I do see, that Nature cannot get on further with species making in this way. There must be something more behind."

Mendel did not find himself in full agreement with the views of Darwin, which at that time were coming into prominence, and to justify his opinions he embarked on his experiments with peas which he continued for eight years. The results were communicated to the Brunn Society in 1863 and published in 1866, but they passed unheeded. The subsequent paper on Hieracium appeared in 1869, and met a similar fate.

During this period of scientific work Mendel was engaged in a great variety of research. In his letters to Nägeli, there are allusions to some of these subjects, but unhappily few statements of results. His largest work, with the exception of that on peas, was an investigation of the heredity of bees. He had fifty hives under observation, and collected queens of all obtainable races, European, Egyptian, and American. Although he effected numerous crosses between these races, it is known that he had many failures. The notes which he was known to have made on these experiments cannot be found, and it is supposed that they were destroyed during one of the periods of depression from which he suffered during the latter part of his life.

For many years Mendel attended closely to meteorology and published his records annually in *Brunn Abhandlungen.* He also took a great interest in sunspots, drawing them, recording the frequency of their occurrence, and making such other observations on them as he could by simple means. He was among those who inclined to the view that there is a connection between the spots on the sun and meteorological phenomena.

Mendel served a term as president of Naturforscher Verein in Brunn, and was chosen chairman of the Moravian Hypothekon Bank. He was also a skilled chess player, and composed many problems which, however, were not published. In Heinsendorf, his native village, he is remembered as having been the originator of a fire brigade. When he eventually became famous, the erection of a new fire station was used as an opportunity of commemorating him, and a memorial tablet was placed on the façade.

The total neglect of Mendel's work is known to have been a serious disappointment to him, as well it might have been. He is reported to have had confidence that sooner or later it would be noticed, and sometimes said, *"Meine zeit wird schon kommen!"*

With the possible exception of Nägeli, none of the leading naturalists of the time ever saw the paper on peas.

Mendel's researches practically ended at the time of his appointment as Prälat of the Königskloster. He wrote Nägeli, at the time, that he hoped that after an interval his elevation might enable him to find better opportunities for study. In 1872, the government passed a law imposing a special tax on the property of religious houses. This enactment Mendel conceived to be unjust, asserting that all citizens should be equal in law, and that if these taxes were imposed on one class of institutions they should be imposed on all. At first several other monasteries stood out with the Königskloster, but gradually they conformed to the requirement of taxation. Mendel alone remained firm. The quarrel involved him in protracted trouble and litigation, which took up almost all of his time. The property of the house was eventually distrained, but he did not yield. He also became involved in the racial controversies which are often in evidence in Austrian Silesia, and it is only too certain that the last ten years of his life were passed in disappointment and bitterness. From being a cheerful, friendly man, he became suspicious and misanthropic. During this period he contracted chronic nephritis of which he died January 6, 1884. It is interesting to know that a few years after his death the tax was removed without debate or dispute.

Until 1900 only one reference to Mendel's observations appeared in scientific literature; namely, that in Focke. Reference was also made to Hieracum in this article. It was through this reference that, in 1900, de Vries of Belgium, Correns of France, and Tschermak of Austria, wrote papers giving the substance of Mendel's long unnoticed treatise, and each one confirmed and extended Mendel's conclusions.

De Vries observed in the evening primrose that new types seemed to arise suddenly; these bred true, and thus gave rise to new species, which he called mutations. In the exposition of his theory he states, "Species have not arisen through gradual selection, continued for hundreds or thousands of years, but by jumps through sudden, though small, transformations." This theory was at variance with the theory of Darwin who supposed that slight individual variations are probably the sole differences which are effective in the production of new species. Natural selection acts solely by accumulating slight, successive, favorable variations; it can produce no great or sudden modifications. De Vries contended that natural selection presides over and improves variation arising from sudden changes.

Recapitulation theory.—After the advent of the cellular theory and during the early work on plant hybridization the recapitulation theory arose. According to this theory animals are supposed in their individual development to recapitulate to a considerable degree phases of their ancestral history. This was suggested in the writings of von Baer (1827-1876) and Louis Agassiz (1857-1862), but received its first clear and complete expression in 1863 in the writings of Fritz Müller. This theory was the dominant note in all of the speculations of Balfour (1873-1882), and received its most sweeping application in the works of Ernest Haeckel. This theory is still adhered to by various authors.

The synthesis of the old views.—All the theories advanced have been more or less synthesized into our modern views. The problem of inheritance today so far as it can be elucidated by structural studies has come to be recognized as a problem of cellular life. Hertwig, Fol, van Beneden and Strasburger solved the longstanding riddle of the fertilization of the egg and the mechanism of hereditary transmission. The identification of the cell nucleus as the vehicle of inheritance, because of the behavior of the chromosomes, was made independently and almost simultaneously in 1884-1885 by Oscar Hertwig, Strasburger, Kölliker and Weismann. Huxley characterized protoplasm, simple or nucleated, as the "physical basis of all life." Today Morgan characterizes the chromosomes as the physical basis of heredity.

The ideas of Haller, Bonnet, and others are found in the theory of inherited organization as an expression of germinal continuity and are vastly different from the old theory of preformation.

The theory of epigenesis, as expressed by Wolf, has been modified to include the conception of prelocalization of hereditary qualities within particular parts of the egg. It has come to mean that development is a process of differentiation of certain qualities already laid down in the germinal elements. The necessity of all hereditary qualities being combined within the egg and sperm was seen early by Darwin (1831-1882). To satisfy this indispensable condition he presented the theory of pangenesis, which had been conceived and combated by Aristotle many centuries before. This theory rested on the supposition that minute particles, which Darwin called gemmules, were set free from all the cells in the body; those of the muscular system, of the nervous system, of the bony tissues, and of all other tissues. These liberated gemmules were supposed to be aggregated within the germinal elements (ovum and sperm). The germinal elements, therefore, would be a composite of substances derived from all organs and tissues. Spencer (1820-1903), reasoning somewhat along the same line, supposed that there were structural units of protoplasm comparable with molecules of chemical compounds; these socalled physiological units within the body he supposed to be composed of a different kind or kinds of units. Distinct traces of these theories are seen in the ideas of Weismann, but explain the fundamental construction of a single type of cell instead of cells in general.

From the time of Buffon until the modern era many theories have been advanced concerning the influence of environment on development. The views of Darwin held sway for many years, but the most satisfactory interpretation of environmental influence on subsequent generations has been demonstrated as a side development of King's carefully conducted work on rats. King has shown that improper nutrition and laboratory surroundings through four successive generations did not permanently impair the growth of the individuals which responded at once to the stimulation of a well balanced diet and proper laboratory surroundings. The rats in the fifth and in the sixth generations grew much more vigorously than their forefathers, and many of them attained an adult size equal to that which is normal for the albino rat. The work of Kammerer on the effects of environment on a particular organ has given definite results. He studied the effects of a gradual return to daylight on the young cave salamander. The animal developed normal eyes and at the same time pigmentation of the skin returned. The numerous studies which have been conducted on the relation of environment to development justify the assumption that the effect is parallel in somato plasm and germ plasm. With return to the normal habitat, the effects of untoward environment disappear and the individual assumes the characteristics of the species to which it belongs.

Continuity of germ plasm.—The basis of heredity today rests on the theory of germinal continuity. Briefly, germinal continuity means that the ovum and its fertilizing agent are derived by continuous cell lineage from the fertilized ovum of previous generations, extending back to the beginning of life. This was first clearly set forth by Virchow who demonstrated that cells both in health and in disease arise only by the growth and division of previously existing living cells, and to express this truth he coined the formula *"omnis cellula e cellula."* It was necessary to establish this law of cell succession before any idea of germinal continuity could prevail. Virchow's work in this connection is of undying value. When the theory of the continuity of living substance was applied to inheritance, a distinction between germ cells and body cells was demanded. It was not, however, until the period of Balfour, Fol, van Beneden, Boveri, Hertwig, and others that the great importance of this need began to be appreciated.

Brown, the discoverer of the nucleus of the vegetable cell, pointed out, in 1849, certain differences between body cells and germinal elements, but did not follow up the distinction. The idea was also forecast by Haeckel in his *General Morphology*. In 1875, Nussbaum clearly stated that the germinal substance was continued from unbroken generations of the past and was the particular substance in which all hereditary qualities were included.

The theory of the continuity of the germ plasm found its most ardent exponent in Weismann (Fig. 2). His teachings were based on the knowledge that all animals, even the highest, begin life in a fertilized egg. This structure, minute as it may be, must contain all the hereditary substance, as it is the only material connection that exists between generations. This hereditary substance, or germ plasm, is the living, vital element of an organism that takes part in the development of a new organism. Weismann pointed out that the many celled body was gradually produced by evolution and that in the transmission of life by higher animals the continuity is not between body cells, but only between germinal elements which represent the primordial substance around which the body has been developed. In all the long process of evolution the germinal elements have been the only form of connection between different generations, and so their continuity has remained unbroken.

The fertilized egg cell of an animal begins its development by dividing into two cells; these divide into four, and so forth. The newly forming cells are not all alike; some develop into muscle, others into bone, or nervous tissue. In short, they become differentiated to form the various parts and tissues of the body, except that a few remain undifferentiated like the original egg cell itself and give rise to egg cells or sperm cells. Weismann called the cells which collectively make up the body the soma cells, whereas those undifferentiated cells destined for reproduction he called germ cells. He maintained that the germ cells, since they are not descended from body cells but only from the fertilized egg cell, have no way of transmitting body modifications, that is, acquired characters. The germ cells are guests in the body, but not members of the household. To show the separateness of germ plasm and somato plasm, Castle transplanted the ovaries from a black guineapig into a pure albino female and crossed with a pure albino male. The six offspring were black. Body cells and germ cells are morphologically distinct, and, therefore, heritable variations cannot have their origin in body cells, but only in the germ plasm. The egg and sperm cells are the sole vehicles of inheritance, and the final unit of the transmission of hereditary characters is the chromosomes, which were first recognized by van Beneden.

The rationale of the theory of Weismann rests in its consideration of the impressionable nature of protoplasm; in fact, the most characteristic property of protoplasm is its response to stimulation. The modifications and subtle changes which result affect its organization, and in the final status are the result of the summation of experiences. Two masses of protoplasm differ in capabilities and potentialities according to the experience through which they have passed, and no two will be absolutely identical. When the body is built anew from the germinal elements, the fundamental qualities of the germ plasm come into play and the whole process is a succession of responses to stimulation. This is in a sense a repeating of historical experience on the part of the protoplasm. In building the organism, the protoplasm does not go over the ground for the first time, but repeats the activities which it took centuries to acquire.

The evident complexity of the germ plasm made it necessary for Weismann, in attempting to explain inheritance in detail, to assume the existence of distinct vital units within the protoplasm of the germinal elements. He invented names for particular units. The fundamental vital units are designated biophors; determinants or determiners are vital units made up of aggregations of biophors. It is on the biophors in determiners that the structure of the future individual depends. These units are often spoken of as genes or unit factors which give origin in the new individual to the socalled unit characters. Ids are made up of groups of determinants. The ids possess power of growth and multiplication. Idants are combinations of ids and are the same as chromosomes.

It was Weismann's opinion that the roots of all heritable variation lie in the germ plasm, that the determinants are continually oscillating hither and thither in response to minute nutritive changes, and are readily compelled to variation in a definite direction, which may lead to considerable variations in the structure of the species.

The life of Weismann is characterized by its lack of the unusual. He was born at Frankfurt-am-Main in 1834. He studied medicine at Göttingen. He was graduated in 1856, and for a short time practiced clinical medicine. As this did not satisfy him, he turned to microscopic investigation in embryology and morphology, in which work Leuckart encouraged him. In 1863 he settled in Freiburg as *privat docent* and, in 1867, was promoted to a professorship in the department of zoology, which he retained until his retirement a few years before his death. He was a forceful and interesting lecturer. After thirty years of age he had trouble with his eyes, but he was always able to do practical work. During the period of greatest distress his wife read to him and helped him in his practical and experimental work. Weismann was an accomplished musician and during his periods of enforced idleness derived a great deal of comfort from music.

The laws of heredity.—The prolonged endeavors of investigators of heredity have resulted in the establishment of certain principles which must be reckoned with in the classification of hereditary conditions, and in the attempt to prove unclassified conditions hereditary. Heredity has as definite a program for its understanding as has bacteriology, chemistry, or physics, and like these sciences it has come to signify a definite branch of learning. There is, therefore, no reason why the word heredity should continue to be used by physicians in discussing certain conditions in man in any sense except the correct one.

There are six laws and a corollary which have been found to govern matings. The first two were formulated by Mendel, and the others have been very clearly worked out by Morgan. The first law of Mendel is known as the "segregation of characters," and the second as the "independent assortment of characters." These laws are well illustrated in Fig. 4. The transmission of the colors or characters, red and white, clearly demonstrates the phenomena in heredity which Mendel interpreted as the segregation of characters. In simple terms this means the separation in the second generation of the identical characters present in the parental generation. Mendel also believed each character to be transmitted independently of all other characters. This may be true for the characters represented in Fig. 5, but sufficient evidence is available to warrant the statement that the second law is only true within as yet undefined limits.

The four other laws and the corollary are really explanations of the first law of Mendel and of reasons for a restricted acceptation of the second law. These laws are known as, 1, linkage; 2, linear order of genes; 3, interference, and, 4, limitation of linkage. The corollary to linkage is "crossing over."

Linkage is the union of groups of determiners in the germ plasm, and as a result certain pairs or groups of characters always appear in the same individual. When it has to do with the factor for sex, it is known as sex linkage. The proof of linkage, often spoken of as coupling and repulsion, although studied by many investigators, has been clearly worked out by Morgan and his coworkers on the fruit fly Drosophilia. If two flies belonging to this species, one with recessive mutant (sport) characters, black body and vestigial wings (Fig. 6), and the other with wild type body color (gray) and long wings, are mated, the offspring are of the wild type body (gray) with long wings. If one of the males of this crossing is back crossed to a black bodied vestigial winged female, the offspring are of two kinds only; one half have black bodies with vestigial wings, and the other half have gray bodies with long wings. In other words the two mutant characters, black body and vestigial wings, that went in together, have come out together, and their two normal allelomorphic characters, wild type body, color (gray) and long wings, have also come out together. There are no flies of the second generation that are black bodied and long winged, and none that are vestigial winged and of a gray body color, as would be the case if independent assortment took place. The characters, gray body with long wings, and black body with vestigial wings, are spoken of as linked.

Sex linkage.—The results of breeding in which this principle comes into play were studied by Wood and completely worked out by Darbishire, who found "When horned breed of sheep, the Dorset horned, in which the horns are well developed in both sexes was crossed with a hornless race, such as the Suffolks, both sexes in which are hornless, the result was that all male lambs of the first hybrid generation developed horns, whilst the female remained hornless. The result of reciprocal crosses was identical. It appears that the horned characters were dominant in males, but recessive in females. But this view is shown to express the truth imperfectly by the appearance in the second hybrid generation of horned ewes and hornless rams. The explanation of these phenomena, so far as it is an explanation, is found to be that a ram is horned both when he is heterozygous and homozygous, whilst the ewe is horned only when she is homozygous for it. That is why all the ewes in the first hybrid generation were hornless. In other words, a ram will develop horns with only one dose of the horned character, but an ewe needs the two doses which are only present in the homozygous condition of that character." An appreciation of the explanation of sex linked inheritance clarifies the method of inheritance of hemophilia and color blindness in man. These characters are considered to be sex linked.

Crossing over, the corollary of linkage involves a change in the mechanism of linkage. In illustration of complete linkage, the cases chosen were those in which entire chains of unit factors in the chromosomes remained intact during the reduction divisions. In some cases there is an interchange of blocks of genes between homologous pairs of chromosomes. This interchange is called crossing over, and refers to the behavior of chromosomes during the processes of fertilized ovular division. The evidence obtained by Morgan and his assistants shows that this procedure is not haphazard, but gives numerical results of extraordinary constancy. If a black fly (Fig. 6) with vestigial wings is crossed with a fly with gray body and long wings, the offspring of the first hybrid generation have gray bodies and long wings. If one of the females of this generation is back crossed to a male fly with black body and vestigial wings, the second generation consists of four kinds of offspring: 1, black body with vestigial wings; 2, gray body with long wings; 3, black body with long wings; and, 4, gray body with vestigial wings. The two latter flies are the expression of crossing over. Under fixed environmental conditions the percentage of crossovers is definite for a given stock of a given age.

The linear order of genes.—The evidence on which this law was established is furnished by linkage and crossing over. When three mutant characters, yellow, white, and bifid, were used by Morgan in a single experiment, it was found that there were 1,160 noncrossovers, fifteen flies representing single crossovers between yellow and white, and forty-three flies representing single crossovers between white and bifid. There were no double crossovers. The simplest way in which such a relation can be thought of is that the three genes stand in the chromosomes in a straight line. There is no other geometrical arrangement conceivable that can satisfactorily explain the occurrence. When double crossing over takes place between two characters y and B (Fig. 7), the two series that result as marked by their ends alone (y and B) are still y and B. The result would be considered as representing noncrossover.

A B C D E F G H I J K L M N
a b c d e f g h i j k l m n

Fig. 8.—Letters representing certain physical characters as they exist in the chromosomes.

A B C D E f g h i j k l m n
a b c d e F G H I J K L M N

Fig. 9.—Scheme showing the way certain blocks of genes interfere with crossing over.

a b c d e f g H I J K L M N
A B C D E F G h i j k l m n

Fig. 10.—Scheme representing a certain type of interference.

a b c D E F G H I J K L M N
A B C d e f g h i j k l m n

Fig. 11.—Scheme representing another type of interference.

Interference.—One of the most significant results that a study of crossing over has brought to light is that whole blocks of genes go over together. This means pairs of linked genes do not act independently of their neighbors, but that a break in a chromosome with certain types of genes interferes with a break in other regions when the intervening block is of a certain length (Figs. 8, 9, 10, and 11). In lengths more or less than a certain standard no interference occurs.

Limitation of linkage groups.—According to Morgan the limitation of linkage groups depends on the number of chromosome pairs. The only species in which a correspondence that is numerically significant between the two has been proved is Drosophilia melanogaster. Despite the absence of other positive evidence, the fact that in no other animal or plant does the number of linkage groups exceed the number of chromosome pairs may be legitimately interpreted in favor of the view. Bateson is of the opinion that this hypothesis should be accepted with caution.

DISCUSSION.

The mechanism of heredity came into play with the appearance of bisexual life on the surface of the earth. Its laws will continue to function until such life becomes extinct.

The physicobiological characters which are transmitted to subsequent generations by means of the germ plasm, furnish the concrete basis for studies in heredity. A biological character signifies the possession of the physical and chemical composition by which individuals may be differentiated. Characters are rendered physically immortal by heredity, and the study of heredity becomes in consequence an investigation of the mechanism of physical immortality. Physical characters become extinct unless perpetuated by heredity. The vehicles on which the transmission of the characters depends are the nuclear structures, chrômosomes, in all germ cells, and in certain instances the cytoplasm of the germ cells. The hereditary substances in the chromosomes and the cytoplastic structures together comprise the germ plasm. The germ cells or gametes in man are the ova and spermatozoa.

Heredity never deals with the etiological factors for disease. Any characters appearing in man that can be proved hereditary are normal, biologically speaking, regardless of how they may make him unfit for harmonious cooperation in economic and social program.

By heredity the quantitative and qualitative characters in all bisexual species are kept extant and limited. Under similar conditions of reproduction, the numerical expression of the transmission of these characters follows very closely, or is reducible to, a fairly definite ratio. An hereditary character is always wholly hereditary, and not hereditary on a percentage basis.

The science of heredity includes the study of the intermediate as well as of the immediate stage of certain features of the life cycle. The ova and the spermatozoa form the intermediate stage of the life cycle in man. The rearrangement of chromosomes which occurs following their union furnishes the fundamental basis for the study of the tangible evidences of heredity in the immediate stage of the life cycle.

The term heredity as ordinarily used by medical writers means the presence of a like condition in parent and child. This occurrence is usually described as one of the etiological factors of the disease under consideration. This conception of the science of heredity is too limited and often results in the publication of data which in no way conform to the definite principles which invariably govern the transmission of hereditary characters.

The only laws of heredity that have been demonstrated in man are Laws 1, 2, and 3; in man of course there is no hybrid in the strict sense. The absence of the hybrid generation renders insignificant the terms dominant and recessive, as they are determined by the type of hybrid.[1]

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[1] The author's seventy-two references have been omitted due to lack of space. They will appear in his reprint.

Experimental Study of Immobility of the Diaphragm

By FRANK C. BALDERRY, M.D.,
Perrysburg, N. Y.,

At the suggestion and with the aid of Dr. John H. Pryor, an experimental study has been made of the etiology and effects of immobility of the diaphragm. Since 1916, when Dr. Pryor published his first paper on this subject, more attention has been given to this organ and its functions by both clinicians and röntgenologists.

Clinically it has been observed that certain conditions alter or suppress the action of the diaphragm. Its motion may be limited and its position high when the phrenic nerve is involved by systemic poisoning, pressure of tumors or abscesses, direct injury and injury or disease of the cervical region of the spine. Elevation and limitation of action are also found with ascites, accumulations of gas in the abdomen, abdominal tumors, peritonitis, subphrenic abscess, hepatic abscess, and perinephritic abscess. Pancoast has found that in the early stages of acute pleurisy this condition is present due to reflex action. In pulmonary tuberculosis with the lesion limited to the upper lobe, in aneurysm, emphysema, pneumothorax, pleurisy with effusion, empyema, myositis, and degenerative changes of the muscle, the diaphragm is observed in a low position and its normal excursion is limited or entirely absent.

Experimentally we produced immobility of the diaphragm by three methods: 1. Simple pleurisy with effusion—meaning by this an inflammation of the pleura with a serous exudate caused by an irritant and not due to bacterial invasion. 2. Pleurisy with effusion produced by the tubercle bacillus alone, or in conjunction with the staphylococcus. 3. Freezing the phrenic nerve with ethyl chloride. One hundred and thirty-five rabbits and twelve guineapigs were used. All were fluoroscoped before inoculation, and normal excursion of diaphragm noted. To be sure that the inoculation was intrapleural, the water manometer was used and a negative pressure with fluctuation of the column of water observed.

In the production of a simple pleurisy with effusion, twenty rabbits were given an intrapleural injection of five c. c. of twenty per cent. aqueous solution of peptone. This produced a rapid exudation of serum in the pleural cavity, usually of such an amount as to cause great dyspnea and embarrassment of the heart's action, necessitating the removal of the effusion by aspiration in from eighteen to twenty-four hours. Fluoroscopy of these animals during exudation showed an effusion upon the affected side (right side used in this series). The heart and mediastinal contents were displaced to the left. The diaphragm was in a low position and flattened, its normal convexity destroyed and motion absent. Inversion of the animal with the resulting gravitation of the fluid away from the diaphragm caused the diaphragm to resume its convex form and motion to be reestablished.

Undoubtedly, the weight of the abdominal organs and the fact that the intraabdominal pressure was positive were factors in causing the diaphragm to regain its normal convexity, but they were apparently not of sufficient importance to cause immobility of the diaphragm. No doubt the increased intrathoracic pressure acted as a balance, and permitted motion to occur. Removal of the fluid also permitted a resumption of diaphragmatic motion.

During this early stage, the pleura and diaphragm exhibited signs of an acute inflammatory process. The serous membranes were reddened, and the diaphragm showed a marked dilatation of its vessels.

Following two or three aspirations, the exudation ceased; and from the tenth to the twenty-first day, on examination of the animal by the fluoroscope, the diaphragm was found to be in a low position and motionless. These animals now appeared normal, except that the respiratory rate was increased and the respiratory movement upon the affected side was lessened. This increased rate, as well as a diminution of the amount of air inspired and exhaled, was shown by graphic records of the tidal air. These were obtained by using a revolving drum with smoked paper and an ordinary drinking glass, its opening covered with thin rubber, a rigid arm attached to its centre for recording on the paper the excursion of inspiration and expiration, and in the base of the glass an opening to which was attached a rubber tube with enlarged opening at the opposite end that fitted over the nose and mouth of the animal and through which they breathed.

At postmortem a retracted chest wall was seen. On opening the thorax little or no displacement of the organs was noted. Free fluid in the pleural cavity was not found but small amounts that had been encapsulated were in a few instances present. The heart was at times found slightly more to the right. The lung was found adherent throughout its lower half, but was usually free in the upper portion. It was normal in color and on section showed atelectasis. Adhesions were numerous and very heavy. Organization was complete and separation of the lung from the chest wall, diaphragm and mediastinal contents difficult.

These occur most frequently and are more dense in the costal sulcus, cardiac sulcus and between the lateral surface of the lower lobe of the lung and the pericardium. The next most common location is between lower surface of lower lobe and diaphragm.

In the costal sulcus from one to three bands were found between the chest wall and the diaphragm. Adhesions were not found between the diaphragm and the abdominal organs. The diaphragm was lower than normal, appearing usually as a straight line from the midline to the chest wall. It was slightly thicker than normal. At about the inner one third, we at times found increased connective tissue and contraction. The pleura was thickened. Atrophy of the muscle was found. There was wasting of the fibres with collapse of the sheath and increased fibrous tissue. Electrical stimulation of the phrenic nerve caused a contraction of the diaphragm.

In this series we had the diaphragm immobile from two separate causes. It was at first immobilized in a mechanical way by increased intrathoracic pressure and fluid. Later by reason of disease of the diaphragm muscle itself and the presence of adhesions. The results in this series were as follows: immobility of the diaphragm, one hundred per cent.; low position of the diaphragm, one hundred per cent.; adhesions greatest in the costal sulcus, twenty per cent.; adhesions greatest in the cardiac sulcus, eighty per cent.; temporary return of motion of the diaphragm after aspiration, ninety-five per cent.; response of the diaphragm to electrical stimulation, ninety-five per cent.; atrophy of diaphragmatic muscle, ninety per cent.; atelectasis of the lung, eighty per cent.

In the first of this series the pleurisy was produced upon the right side only. Forty-five rabbits were used. Two c. c. of distilled water containing virulent tubercle bacilli were injected into the pleural cavity. From the eighth to the tenth day the right chest on fluoroscopic examination showed a generalized haziness and the diaphragm functioning. At this time there were inflammatory changes in the pleura shown by congestion, dilatation of the vessels, swelling, a lack of normal lustre and slight exudation of fibrin. This was most marked toward the mediastinum and in the cardiac sulcus. The diaphragm was hyperemic and this inflammatory reaction was greatest at inner third. Haziness first noted under the fluoroscope gradually increased and, from the eighteenth to the twenty-fourth day, definite lung markings were observed with difficulty. At this time a slight effusion might be seen. This effusion accumulated slowly and varied greatly in amount, at times as low as five c. c. and again as high as twenty-two c. c. The fluid was usually bloody in character and rarely was it of an amber color. The leucocyte count was high.

Fluoroscopic examination disclosed a motionless diaphragm in practically all cases following the presence of fluid. Following the first aspiration, the diaphragm functioned. In two cases immobility of the diaphragm was found without an effusion ever having been present, but the diaphragm retained more of its normal contour and the position was not as low as was usually noted in those with effusion.

This shows that in certain isolated instances immobility of the diaphragm may follow a dry pleurisy. The low position of the diaphragm is greater than the lowest point reached in a normal respiratory excursion. The number of respirations is increased and the tidal air diminished.

At postmortem the chest wall was found retracted on the affected side. Slight bulging of the unaffected side was often noted due to the increased respiratory effort and compensatory emphysema. The intercostal muscles of the affected side were atrophied. On opening the chest after immobility was complete a variable amount of fluid was found dependent upon whether aspiration had been performed recently. The heart was usually displaced to the right as a result of the adhesions between the lung and the pericardium.

The lung was bound down in the lower half by adhesions, and the lower lobe showed an uneven surface and was contracted. Adhesions in the upper half of the chest were rarely found. The adhesions were greatest in the costal sulcus, cardiac sulcus and between the lung and the pericardium. In the costal sulcus there were usually one or two bands that extended from the diaphragm to the chest wall. There were also many fine threadlike adhesions between the lung, the chest wall and the diaphragm. That portion of the lower lobe found in the cardiac sulcus was very adherent to the diaphragm and pericardium. It was separated from these structures with difficulty. The lateral surface of the lower lobe was markedly adherent to the pericardium. This condition is always present and bears out Dr. Pryor's clinical findings. Interlobular pleurisy with the lower and middle lobes adherent to each other was found in sixty-five per cent. of the cases.

Involvement of the lung with tuberculosis was present in ten per cent. of the cases. This condition was usually found in the lower lobe in the periphery. Atelectasis of the lower lobe was marked.

The diaphragm was in a low position. It was adherent to the lung in the cardiac sulcus and frequently in the costal sulcus. Strong bands extended between the chest wall and the diaphragm. It was remarkable that it was not more often found adherent to the under surface of the lower lobe of the lung, and that these adhesions when present were not more dense. Adhesions between the diaphragm and the adjacent abdominal organs except in one instance did not occur.

The diaphragm was thicker than normal and its normal lustre had disappeared. Large deposits of fibrin were found on the upper surface, most marked at the inner third. This inner third was the location of the greatest thickening and was greatly contracted. The fibrin had become organized and the connective tissue was increased. The muscle fibres were wasted and the sheaths collapsed. Fibrous tissue was greatly increased, most marked at the inner third. The pericardium was adherent to the lung in all instances. It was thickened and roughened at this point. Slight pericardial effusion of a bloody character was found in twenty per cent. of the cases. The adhesions between these two structures were very great and were separated with difficulty. The area of greatest inflammatory action was in the cardiac sulcus and at the mediastinum. Electrical stimulation of the phrenic nerve caused contraction of the diaphragm.

In this series we selected twenty animals as showing immobility of the diaphragm and the results were:

Immobility of the diaphragm, ninety per cent.; low position of the diaphragm, ninety per cent.; adhesions greatest in the costal sulcus, twenty-five per cent.; adhesions greatest in the cardiac sulcus, seventy-five per cent.; response of the diaphragm to electrical stimulation, ninety per cent.; atrophy of diaphragmatic muscle, ninety per cent.; increased connective tissue, ninety per cent.; atelectasis of the lung, ninety per cent.; return of motion after first aspiration, eighty-five per cent.; respirations increased, tidal air decreased, ninety per cent.

In the second series both pleural cavities were inoculated at once. In those instances where the effusion upon one side did not develop, the animal was reinoculated upon that side. Forty-five rabbits and twelve guineapigs were used in this series. Guineapigs were found unsuitable for the work, because of their weak mediastinum, death resulting from its rupture. It is not necessary to go into details as the results were much the same as those described previously, but there are certain findings that are of importance.

Dyspnea was more marked and the breathing extremely labored. Respirations were increased in rate and the tidal air decreased. In the early stages general haziness of the entire chest was found. This gradually increased till slight effusion might be observed. The diaphragm remained functioning until effusion had formed in all but four cases. In these it was not a bilateral immobility, but occurred on the right side only. After immobility of both leaves of the diaphragm, it appeared as an inverted letter V with the apex at the ensiform cartilage. The costal and cardiac sulsi were wider than normal due to the descent of the diaphragm. The heart appeared to be in the midline and the apex was more toward the midline. It was narrower than normal and pulled down, assuming a tubular shape. Between the heart and the diaphragm a clear space was seen. Changes noted at postmortem showed that this condition was not entirely respiratory, but also affected the circulatory system to a great extent.

The changes in the lung and diaphragm and the location of the adhesions were the same as when the pleurisy was upon one side only. The pericardium was duller in color and tense on account of the downward pull caused by its attachment to the diaphragm. It was thinner than normal except at the points where it was adherent. There we found a thickening with a large increase of granulation tissue. In a few instances tubercles were found. On opening the pericardium slight effusions of from one to three c. c. of bloody fluid were found in fifteen per cent. of the cases. The heart was smaller than normal and was not of normal shape. When the disease was of long standing the heart appeared tubular. Its normal contour had disappeared. The apex was not found in its normal position on the left, but was displaced more toward the median line. The heart was slightly broad at its base, but almost normal. It appeared narrower and elongated. It had apparently been compressed by the pericardium as a result of the descent of the diaphragm exerting its pull upon the pericardial sac. There was a slight increase of fat in the heart and the muscle fibres show changes indicative of myocarditis and atrophy.

Electrical stimulation of the phrenic nerve caused a contraction of the diaphragm. Twenty animals were used in the series and the results were: Immobility of the diaphragm, eighty per cent.; low position of the diaphragm, ninety per cent.; adhesions greatest in the costal sulcus, twenty-five per cent.; adhesions greatest in the cardiac sulcus, seventy-five per cent.; adhesions between the lung and pericardium, one hundred per cent.; response of the diaphragm to electrical stimulation, ninety per cent.; atrophy of the diaphragmatic muscle, ninety per cent.; increased connective tissue, ninety per cent.; atelectasis of the lung, ninety per cent.; motion returned after the first aspiration, eighty-five per cent.; respirations increased and tidal air decreased, ninety per cent.

In the series of tuberculous pleurisies, 102 animals were used. Twenty animals were selected as showing immobility of the diaphragm either unilateral or bilateral. Ten animals were killed in these experiments after periods of from ten to fourteen days giving us the beginning inflammatory stage with a functioning diaphragm. Those in which a fixed diaphragm developed were killed from the twenty-seventh to the eighty-fifth day. Thirty-five of the animals did not manifest effusions. The early inflammatory stage was most marked in the mediastinum, cardiac and costal sulci. That there were early changes in the diaphragm was proved by the dilatation of its bloodvessels at an early stage. It was not alone pleurisy with effusion, adhesions or paralysis, but a gradual involvement of the diaphragm muscle itself. The formation of the fluid depressed it, the increased sediment in the sulci fixed it and maintained it later in a low motionless position. The circulatory system was influenced primarily, because we were dealing with an infectious condition; and, in the later stages, because of compression of the heart by either the fluid in the pleural cavity or the presence of pericarditis with effusion, these factors resulting in changes in the myocardian. In one instance, the paradoxical movement of the diaphragm was noted in which the leaves moved in opposition to each other. In this case the right pleura contained a small amount of fluid with the dome of the diaphragm in a higher position than normal and the left leaf greatly depressed.

In the production of immobility of the diaphragm by freezing the phrenic nerve, the nerve was exposed in the neck of the animal and ethyl chloride was applied for a period of one minute and thirty seconds. This covered the nerve with a coating of frost that persisted for about forty-five seconds following the discontinuance of the application of ethyl chloride. Immediately following the operation, less motion of the diaphragm was observed. At the end of ten hours motion was entirely absent. In this condition the diaphragm was in a high position of paralysis and its normal convexity was increased. The height of the dome was greater than during normal expiration.

On cutting the phrenic nerve, immobility and elevation of the diaphragm were immediate. Severing both nerves caused death. After cutting one nerve it was possible to influence respirations by irritation of the opposite nerve. Attempts to freeze both phrenic nerves at one time resulted in the death of the animal. Readings of the water manometer following freezing of the phrenic nerve showed an increased positive pressure. The immobility of those with frozen phrenic nerves persisted from five to seven weeks, when motion could again be observed. Electrical stimulation failed to bring on a contraction of the diaphragm from the tenth to the fortieth day. The lungs were normal except for slight atelectasis in the lower lobe. The diaphragm muscle showed atrophy of the muscle fibres with wasting, shrinking of the sheaths and changes in the nuclei.

It is our intention to produce pulmonary tuberculosis in animals and treat them by freezing the phrenic nerve, in the hope that it may influence the disease by causing less respiratory action of the lung. This procedure has been employed by a few German authorities in the treatment of pulmonary tuberculosis as a substitute for artificial pneumothorax. Good results are reported. It was our original plan to present work upon the prevention of this condition. In making our report on the series of tuberculous pleurisies we selected only those animals showing immobility of the diaphragm. It was our intention to treat the other animals as effusions developed with the aim of saving the motility of the diaphragm. Because of an epidemic that caused the death of practically all these animals, we were able to treat only a few.

We selected artificial pneumothorax as our first procedure in the hope that this would limit the formation of adhesions. By the use of some gas that might kill the tubercle bacillus or inhibit its growth, it was desired to shorten the duration of the disease. Air was at first used, but it was not found practical because of its rapid absorption. It was interesting to note that in normal rabbits introduction of sixty c. c. of air caused marked dyspnea and cyanosis. After twenty or thirty minutes dyspnea was still present but much less marked, and cyanosis had disappeared. In from twelve to twenty-four hours the animal appeared normal and a pneumothorax could not be observed.

It has been found that carbon dioxide in the proportions of three to one hundred of air has an inhibitory effect upon the growth of the tubercle bacillus. We used it in the ratio of three and five parts of carbon dioxide to one hundred parts of air. Too rapid absorption of the mixture was again encountered. A mixture of sulphur dioxide and air was tried and found to be less readily absorbed, and so was used in the treatment of five animals in which pleurisy with effusion occurred. The fluid was removed from these animals at various intervals dependent upon the extent of its accumulation.

At the time of aspiration, refills of the chest were made. These had to be repeated often because of the absorption of the mixture. The average number of treatments given was fourteen. These were given each day. Fifteen c. c. was usually introduced. The amount of sulphur dioxide varied from one part in one hundred to one part in three thousand of air. The exudation was apparently not increased by the use of a mixture of one part to one hundred. This did not produce cyanosis and dyspnea was mild. It was not possible to aspirate the entire amount of fluid in the chest. Fluoroscopy following aspirations always disclosed fluid in the costal sulcus. Of the five animals treated, in one an immobilized diaphragm did not develop; one was in a low position with greatly restricted excursion, and in the three remaining animals immobilization took place.

Freezing the phrenic nerve in those rabbits with pleurisy caused the diaphragm to assume a high position and to be motionless. The diaphragm became fixed in this position; the formation of adhesions was not influenced so that the procedure was discontinued, as it held forth no promises of saving the motility of the diaphragm.

Artificial pneumothorax seems to hold forth some promise as a therapeutic measure. Weil, who has used artificial pneumothorax in the treatment of pleurisies with effusion in an attempt to save the motility of the diaphragm, believes strongly in this procedure. He also says that "electrization of the diaphragm and of the phrenic nerve has not furnished different results."

We agree with Corper and Rensch that pleural effusions are as likely to occur in normal rabbits without previous sensitization as in those animals that have been sensitized. We also find the areas of inflammation most marked at the mediastinum, pericardium and inner third of the diaphragm. That this could be expected in animals seems rational to suppose, since the fluid will gravitate to the lowest point. Slight motion may be noticed in the diaphragm after complete immobilization. This is due to the movement of the ribs and intercostal muscles. Because of the adhesions between the diaphragm and the chest wall and the increased connective tissue formation in the diaphragm with subsequent contraction, complete immobilization does not occur until retraction of the chest wall is present.

That the effects of immobility of the diaphragm are not limited to the respiratory system is shown by the changes in the heart and pericardium. The parietal pericardium always discloses inflammatory changes, and there is very often pericarditis with a small amount of exudation. Changes in the heart muscle are frequently present. The involvement of this organ and its covering undoubtedly has a very direct influence upon the clinical symptoms of rapidity of pulse rate and dyspnea. Paralysis of the nerves of the diaphragm as a cause of immobility and low position of the diaphragm is unlikely, for with paralysis, the muscle assumes a high arch. Response of the diaphragm to electrical stimulation proves that the nerves were not involved.

The cause of immobility of the diaphragm is probably not due to one particular condition. Mechanically, the presence of fluid places it in a low immobile position, but decreasing the intrathoracic pressure by aspiration permits it to function again. In this connection one authority states that increased intrathoracic pressure must be present before there is descent of the diaphragm. In this we do not fully agree, as there are in a small percentage of instances immobility and low position without the formation of effusion.

The increased deposit of sediment in the sinuses and the many thick adhesions that result are also not alone the cause. Early involvement of the diaphragm with later changes in its structure probably plays the most important rôle. We feel that this disease of the diaphragm in conjunction with the effusion and adhesions is the cause of its immobility and low position. A careful search of medical literature has revealed few instances in which a postmortem study had been made of the diaphragm. The pathological findings correspond to our own insofar as structural changes in the diaphragm are concerned. It is our plan to continue this work giving particular attention to the matter of treatment, and we hope to be able to suggest a method that may in the great percentage of cases prevent this condition.

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General Theory of the Neuroses

Concepts of the Theory

PART I

By ALBERT POLON, M.D.,
New York.

PSYCHOLOGICAL APPROACH.

One of the distinguishing features of the psychoanalytical theory of the neuroses is its psychological approach to mental and bodily symptoms of functional diseases. This viewpoint has been evolved in order to account for pathological phenomena which do not lend themselves to a satisfactory explanation by the application of the concepts of anatomy and physiology; also to meet a need which has not been filled by descriptive psychiatry. This approach does not limit itself to description but aims at the origin, mode of genesis, and the meaning of symptoms.

In respect to this approach, this theory shows a deviation from the tradition of medicine and psychiatry. The mental attitude which it implies is strange to one who has been trained to view clinical phenomena in terms of cellular activity and topical organ localization. Equipped with these means alone one finds the investigation of neurotic disease practically fruitless, since the crucial question is why and for what did the mental symptoms arise, and not as to what are their anatomical and physiological substrata.

The example of a hysterical phobia—called agoraphobia, will illustrate this point. The patient is scrupulously avoiding open places—wide streets, squares, and what not. He runs away from them as if they were a source of danger for him. For the somatist the only interest is in how the man is running away. What are the various neuromuscular mechanisms at play? To answer this question implies an enormous amount of research valuable in its special field, but it is useless to answer the question why the patient runs away. And yet there is a cause for his behavior. The causal connection can be expressed only by the recognition of the fact that the man appreciates danger. In other words the situation generated a psychological process which evoked motor activity. That is the reason he fears and flees from the particular place.

There are various other aspects of this symptom, which would be impossible to account for in terms of somatic function. Let us consider the case of the man who fears open places under particular circumstances, for example, when there are only few people and vehicles about. Why this apparently paradoxical reaction? The answer to this can again be obtained only by an investigation of the psychic process underlying the symptom. We would then learn of special considerations which guide the man's behavior under the particular conditions. We would find that the psychic process operative in this instance presents two phases. On the one hand this man's actions would in a measure correspond to the typical reactions of all human beings, and on the other his actions would be determined by motives which arose from his individual experience. Certain things acquired a particular meaning for him. His mental presentation of what constitutes the need for flight is differently associated from that of the average person. The finding of these individual elements in the mental process constitutes the prominent feature of the modern psychological approach. All these considerations which hold for the functional phenomenon with motor activity apply with especial emphasis when we deal with what one would call the pure mental symptom of a compulsion neurosis, designated also obsession. Neurophysiology and psychophysics can not even attempt to throw light upon this intricate phenomenon. There is nothing known in the soma of a compulsion neurotic that could account for the appearance of this symptom or for its particular morphology. The insight as to why it came about, why it has this particular form, and what it does in the economy of the mental life of the subject can only be obtained by an analysis of the psychological processes which generate these ideas. Also in this instance we would learn that in some respects the compulsion ideas follow the rules of typical thought and that in others they constitute an individualistic psychic reaction to special experiences, accounting for their deviation from the normal.

From these remarks we may gather that the essential of the psychological approach consists in dealing with mental phenomena in terms of their own category. In this procedure we avoid an explanation of the manifestations of the mind on an anatomico-physiological basis, as one would avoid seeking to explain digestion of proteins on the ground of a psychic mechanism. The empirical data of the neuroses with which this theory deals are the phenomena of consciousness.

PSYCHIC DETERMINISM.

Agreeing upon the validity of this material, psychoanalysis proceeds with it in exactly the same manner as any other branch of science with its material. It first aims at an exact identification of facts—it describes them. It next correlates them in the light of certain concepts, which are most helpful for correlation. And finally from the obtained concepts it formulates the theory which could account for all the phenomena coming under its scope.

Now the fundamental concept of all science is causality. Without it scientific investigation would be only an accumulation of facts, or only description. The correlation of data forces the necessity for a causal connection. One then views any given fact as a link in a causal chain. That which is, was produced by something before it, and again this given fact shall in its turn be the source of genesis for subsequent facts.

It is this principle of causality which constitutes the second distinctive characteristic of the psychoanalytical approach. Every element of mental life, whether an idea, feeling or connative state, implies a previous psychic state with which it is causally connected. It is determined by elements which have generated it, and in its turn it will result in further psychic manifestations.

Naturally we have no difficulty in seeing psychic determinism in phenomena in which the motive as an operating agency is clearly evident, as in the transparent cases of consciously directed thinking and in intentional acts.

But this causal connection is present also in those events which appear spontaneous and accidental, and of which there is no evident relation with the surface content of consciousness. In other words, causality operates also when they appear as irrelevant or actually contradictory to intention, as if they originated in another person. This strangeness and irrelevance constitute an important characteristic of several groups of mental phenomena, among which the most significant for our consideration is the neurotic symptom. An investigation would show that that which seems to be outside of the causal sequence of events is in reality definitely determined.

The problem may perhaps be put this way: Ordinarily man's thoughts and actions are clearly seen to be sensibly connected with each other. For every new step there are enough accountable reasons constituting the motive. Suddenly we find that this orderly sequential series is interrupted. There appears a gap between one point of consciousness and the next one. Between the two the gap is bridged by the strange and irrelevant thought or action.

This is the quality possessed by such phenomena as symptomatic acts, dreams, neuroses, psychotic episodes and neurotic character features. Let us consider the symptomatic acts. Under this term are embraced unintentional acts occurring in the normal. They vary from unimportant errors of speech, writing, reading, misperception to manifestations of a more serious consequence, such as mislaying or losing of things, or of forgetting to carry out weighty decisions.

In all these instances analysis would reveal that they were produced by motives of which the subject was not aware, but which nevertheless asserted themselves. In this light an error not due to ignorance turns out to be as much of an intentional act as the one which is readily acknowledged as such. A case of a misspoken word, for example, would show that into the conscious stream directing the speech there entered another factor, another motive which should have been excluded for reasons of either logic or expediency. The other motive, contradictory to the one inducing the speech, breaking through its barrier obtrudes itself upon the word to be used correctly, and deforms it in proportion as it succeeds in making it express not only its proper connotation, but also the one imposed by the intruder. The error in speech expresses both that which should have been said as well as that which should not. To give an example quoted by Freud: A lady by way of admiring the hat of another says: "I am sure you have messed up this charming hat yourself." The word "messed" expressed the thought "this hat is a mess," but it also clearly implies the proper word "made." Or the slip of tongue of an energetic lady who states: "The doctor said my husband did not need any diet. He should eat and drink whatever I want." The error in the word "I" voices the intruding tendency of the lady to assert herself even in food needs of her husband. But then it clearly has the connotation of "he."

The striking feature of these errors is that they express in a condensed manner two contradictory motives. The psychological mechanism which gives them their configuration is condensation. Their genesis is due to the breaking through of a tendency which should have been repressed for the occasion, in other words, inadequate repression. Conflict of motives and inadequate repression brings about the symptomatic act. In the light of these concepts the error has a meaning and a definite place in the causal series of mental life. Contrary to the prevailing notion, it is not an exception to the law of psychic determinism.

THE UNCONSCIOUS.

There is an important implication necessarily involved in the finding of the study of errors. One is that since a motive may be effective without being registered in consciousness, the conclusion is unavoidable, that "psychic" is not identical with consciousness. The realm of mental function extends beyond those registered in awareness. The mind which reveals itself as attuned to real situations, in terms of evident motives, constitutes only a cover, an upper stratum of the psyche, a net resultant of several conflicting factors, which have thrown upward some of the material in the form of consciousness. Under it are present unconscious psychic forces, which are in a state of tension ready to obtrude themselves upon the surface. In brief, there is an unconscious dynamic mentality.

We thus come to the consideration of the unconscious, the concept of which is indispensable for any sort of an orientation in the phenomena of neurotic, as well as normal mentality. Together with the principles of psychological approach and psychic determinism it constitutes the cornerstone of the psychoanalytical theory. Historically, it has been evolved from the study of functional nervous disease, but it is in the phenomenon of dream that it accords the best opportunity for its investigation. Let us briefly review what psychoanalysis of the dream has shown of its nature and what bearing it has upon the unconscious.

The dream viewed psychologically reveals itself as a psychic reaction of the state of sleep to disturbing stimuli, whether they arise externally or within the organism. The sleep itself in such an approach is regarded as a condition into which the mind retires, by withdrawing all its interests from the outside world. To fall asleep is to become selfsufficient; it is to become the source of one's excitations and of their gratification at the same time. It is to preserve this blissful selfsufficiency, which is so much like the intrauterine condition of the fetus, which constitutes the purpose of the dream. Contrary to the popular notion the dream is the guardian of sleep.

The disturbing factors of sleep are only in a small measure coming from the external world; preeminently the disturbance arises within the organism. All its instinctive and impulsive needs which are tolerated as well as those which are repressed—the ungratified wishes, the checked tendencies, all the minuses between what was wanted and what one got, in short the whole galaxy of psychic forces which make up the living going personality in the waking state, continue to manifest themselves in the dream. Every element of its weird and grotesque structure can be accounted for by a corresponding tendency, ordinarily kept in check, breaking through the repression, weakened by sleep. Having thus attained some psychic representation in consciousness, this repressed tendency is on its way to realization. However, due to sleep, the psychomotor apparatus is out of commission. There is no way of transplating the newly emerged psychic trend into activity. Therefore the only recourse is to a hallucinatory gratification. Uncontrolled by external reality, the psychic process of the dream bears the earmarks and peculiarities of the unconscious. Among the most prominent ones may be mentioned:

1. The tendency of transposing all special sense simuli and even intellectual abstractions into visual images.

2. The peculiarity of compressing, by means of condensation, a large number of objects into one image.

3. Or the reverse, have a number of different objects express the same meaning.

4. The displacement of emphasis to secondary elements in the dream story, which adds to the obscurity of its meaning. Often the important element is indicated by a mere allusion.

In view of the fact that the imagery dealt with is essentially visual and that this imagery is to express the tendency of an impulsive striving with its active pressure for realization, the whole dream becomes subject to dramatization, and appears as a cinematographic succession.

These are some of the important data of the dream mentality one obtains, when the dream is subjected to analysis. One finds that it has a purpose and a meaning and is the expression of numerous tendencies of which the sleeper is not aware. It is because of this absence of awareness from the motive side of the dream, that it must be distinguished as having two phases. One which is given as the story of the dream—termed manifest content. The other is the psychic process behind this configuration—the latent content. The latter is the creator of the former, its psychic determinant. To get the meaning of the dream we have to decipher the manifest content, for the meaning and the purpose of the phantastic structure is in the unconscious.

We then learn that the unconscious is essentially dynamic in its nature, powerfully surcharged with affects. The affective forces take their origin from the instinctive and impulsive sources of the organism. At the very bottom of the whole mental life lie the autochthonous excitations arising from the different organs, which, reaching the upper levels of the nervous system, translate themselves into psychic excitations. It is these autochthonous excitations which constitute the impulse behind the mental phenomenon, using it and the psychomotor apparatus as a means of obtaining gratification. However, before the instinctive impulse translates itself into the highest psychic form of consciousness, it goes through the lower state of the unconscious, in which state it has all the earmarks of a psychological process, except one—namely, it is not in a position normally to influence the psychomotor apparatus. Normally it cannot determine motional activity. Its sphere of action therefore is the world of phantasy. Before it emerges into conscious, purposeful activity, it must pass the censorship of repression as to its expediency and desirability. Only after it finds a tolerable ideational content can it see the light of day. This is how the manifest content of the dream comes about. Emerging however under the condition of diminished effectiveness on the part of the censorship on account of sleep, the manifest content bears many of the earmarks of the unconscious and thus accords the opportunity to identify the unconscious. Of course we do not obtain it in its pure state, but rather as a component of a psychic structure which contains also the effects of the forces of the censorship. We can recognize it only as a part of a compromise formation. The differences between the compromise product and the normal purposeful thought processes are the qualities of the unconscious.

The twofoldness of origin of the manifest content of the dream would account for the two kinds of material that go into its makeup. On the one hand we have the rests of previous day experiences; persons one has seen and things one has done before retiring. And on the other hand the material of the dream may be made up of the most remote experiences dating as far back as the earliest childhood. The incongruity and irrelevance of the material is the mark of the unconscious. Whatever of the sequence and order of structure there is in the dream must be ascribed to the censoring function.

But be the material whatever it may—it always possesses two characteristics: It is suitable to express the unconscious tendency and it is acceptable to the then present censorship. Among the various images it uses there are some that have a constancy and consistence of connotation, not only for the individual but for the social group or even the race at large. Such an image is termed—symbol. Its chief feature is that, carrying a meaning of which the subject is unaware, it becomes adaptable to slip through the censor. It means one thing to the censor and another to the impulse which sent it out. The unconscious for this reason shows a predilection for the usage of symbols. Symbolism is one of the means of distorting the structure of the dream.

One other important fact should be mentioned, which the analysis of the dream reveals regarding the unconscious. The particular repressed craving which induces the dream is one which existed in the unconscious for a very long time. The original occasion when it sought expression and was inhibited, it was not abolished thereby—on the contrary, the fact that it was not abreacted gave it a lease of life. Its coming to the fore in the dream is an attempt to spend itself—to abreact. Now the whole unconscious content consists of such unabreacted forces which arise from all occasion of repression, but mainly from the epoch of greatest repression, namely the developmental period of early life. Since cultural development is essentially a process of inhibition of instinctive cravings, and since this takes place primarily in early childhood, it becomes clear why the unconscious bears the mark of infantility.

In connection with this note should be taken that the analysis of dreams of all persons shows that the nature of the repressed tendencies is preeminently sexual. There is no other phase of man's existence that is subjected to so many inhibitions and limitations. From the very inception of human culture every phase of human organization had as its primary objective—the regulation of the sex instinct. This problem did not diminish in extent or intensity with the advance of civilization. On the contrary, it constitutes the bulk of contemporary social regulating measures: Custom, morality, religion, family, and so forth. Furthermore, in porportion as the energy from the sex stimulation is directed to the nonsexual aim, but is harnessed for social service, culture becomes a possiblity. Every human individual must undergo all the inhibitions which the human race has evolved in the course of its cultural development. Every infant commences life with the pressure of his sex cravings as if he were born at the dawn of human society. Layer by layer of checks and inhibitions, constituting repression, are deposited to hold down the polymorphous sex instinct and to assign to it a limited socially justifiable channel of expression. The amount of energy thus spent must indeed be great, but so also must be the force of the sex impulses, which, as has been pointed out, continually persist to bombard the inclosure separating the unconscious from consciousness. It is for this reason that the unconscious as revealed by the latent dream content, is intensely colored with sex.

It is beyond the scope of this presentation to go fully into the psychology of the dream. It has been chosen merely as a means to convey the concept of the unconscious. Its features which concern us here are the following: The dream is inexplicable unless interpreted as being determined by the unconscious. The unconscious psychological processes are the derivatives of impulses which have not been abreacted. They obtain partial realization by obtruding themselves upon consciousness and make their marks upon it by distorting it. These marks are the mechanisms of condensation, displacement, identification, and other processes. The nature of gratification thus obtained by the unconscious process is that of hallucinosis. The character of its content is primarily infantile, and its dynamic force is derived from the sexual impulses.

The concept of the unconscious is subject to much attack and criticism. And yet a psychological approach to mental phenomena would be impossible without it. Symptomatic acts, dreams, hysteria, compulsions, acquire a meaning and purpose only on the basis that they are products of the unconscious. Similarily inexplicable without it would be the startling spontaneity of some complicated thought processes, which can be elaborated in astounding detail without awareness on the part of the subject. The whole problem of memory, viewed psychologically implies the existence of the unconscious since consciousness has a comparatively small scope.

Besides this consideration of the indispensability of the unconscious for purposes of orientation, we also have the direct proof of its existence in the phenomenon of posthypnotic suggestion. A posthypnotic suggestion is given to a person to carry out a certain activity. Some time after the seance the subject, oblivious of the order, spontaneously performs the required act. Between the time of being given the suggestion and the time of its carrying out, the person retained in his mind a complicated ideational system capable of translating itself into a coördinated activity, without his having a conscious knowledge of it.

Apart from being pragmatically justifiable and subject to direct proof, the status of the unconscious is as legitimate as the concept that every person other than ourselves has a consciousness. After all it is only our own consciousness which is given in immediate experience. The consciousness of the other person is always implied, on the ground that since consciousness is associated with our behavior, a similar behavior on the part of others must also be associated with consciousness. When we have before us psychic processes which possess all the earmarks of consciousness minus awareness, we are not violating the sense of plausibility when we designate them under the category of the unconscious. To classify them with consciousness would only create confusion, since they lack the characteristic feature of awareness.

From these considerations one finds himself compelled to regard all psychic processes as being first unconscious, of which only a few are appreciated in awareness. In this respect Freud compares consciousness to a sense organ. The sense organ gives an appreciation of the outside world only in some of its aspects. Similarly consciousness registers only some of the psychic events which transpire in the mind. Didactically stated—psychoanalysis conceives every psychic event as passing through two phases. In the first it is unconscious. Before it reaches the second phase it has to pass a censorship. If it succeeds it is allowed to enter the second phase, which is consciousness. If it is disapproved by the censorship it becomes repressed and must remain unconscious. In this state of being unconscious we must distinguish another peculiarity. Some of the rejected material is never able to become conscious; some other again may be admitted at certain propitious moments. This psychic material is termed the foreconscious. It is not in consciousness but it is capable of getting there.

Such an orientation in mental phenomena, with respect to the special systems it belongs to and between which it transpires, is spoken of as topical, and is characteristic of psychoanalysis.

Freud characterizes the unconscious as distinguished from consciousness by three important qualities:

1. It is devoid of the principle of contradiction; any idea may have any connotation.
2. It is timeless: Its content has no sequential arrangement as to time. Time makes no impression upon it—it does not lose its energy because of duration. In general it has no relation to time.
3. It takes no cognizance of reality. It is essentially dominated by the pleasure principle. It substitutes psychic reality for external reality.

Thus do the unconscious processes reveal themselves to the observer in neuroses and dreams. In other words dreams and neuroses represent a regression to a lower level of psychic activity.

REPRESSION.

In the foregoing consideration of the unconscious, time and again reference has been made to repression. It was implied that if a mental process is said to be unconscious that it was the equivalent to saying that it is repressed. If its state of being unconscious is comparable to a state of banishment, then repression is the function, which banishes on the other hand, and on the other keeps the excluded event in exile. It first rejects a psychic process and then continues to keep it at distance from consciousness.

What can be the immediate purpose of this exclusion? Clearly to obviate the mental pain which the event did or could engender. Whereas pain and displeasure coming from the outside world are reacted to by means of flight, upon their arising within the organism—the response is repression. To avoid pain is the immediate purpose of this reaction.

A psychic process is capable of calling forth mental pain because it tends to set off the psychomotor apparatus for bringing about gratification, which would be in conflict with the rest of consciousness. In other words, it is the impulse behind the ideational content, which is the pain producing factor. Repression is essentially directed against it.

Now the impulse clothes itself in various ideational forms. On its way towards externalization it mobilizes all sorts of ideas, provided they are suitable to carry its meaning. The various constellations thus produced are to be regarded as its derivatives. Their number is large and their configuration quite varied, but the significant thing in them is the instinctive striving, which energizes them. They are merely its representatives.

These various ideational disguises the impulse takes recourse to, in order to pass the censorship. In proportion to the removal of their ideational associations from the raw aim of the impulse, they have a better chance of passing the barrier. The main prerequisite for the evasion of the censorship of the repression on the part of an impulse is the remoteness in association of its representative ideas. Thus for example the impulse to dominate is not permitted to appear raw and naked, by the higher consciousness of the cultured man. But when, however, by way of association of ideas it emerges as a patriotic motive, or as an aim of social service, then it is granted admission and is reckoned with as a laudable quality of the statesmen. Another example is that of the sex urge in a young girl. It is utterly tabooed by her ego unless it manifest itself under the disguise of friendship, desire to assist or redeem, interest in intellectual and moral qualities. All these derivatives evade repression because of their remoteness from their source.

Between the raw aim of the impulse and its much disguised form, there are numerous energized ideational systems, all of which are kept below the threshold of awareness. Their being repressed does not in any way affect their viability. Repression only determines as to what system they are to belong to. In the unconscious they continue their existence. There they are capable of all kinds of combinations amongst themselves. An extreme example of such ideational combinations is the phenomenon of double personality.

Interesting is the fate of the impulse and its derivatives with respect to the degree of repression applied to them. The more complete the repression, that is, the fewer and narrower the channels for their collateral discharge, the more effective is their influence upon the rest of the content of unconsciousness.

Proportionate to the amount of their pent up energy, they weave and combine with all sorts of elements, of most remote associations. They thus evolve a structure which upon a sudden or chance uncovering of the unconscious, astounds one as to its magnitude and complexity. Clearly their power is derivable from the fact that as a result of their being repressed, they were not accorded gratification; they were not abreacted. Their energy is utilized by way of an unchecked development in phantasy.

The remoteness of association as a criterion for the evasion of repressions is made use of in psychoanalytical technic. In the course of analysis the analyst has repeated occasion to observe that the patient would suddenly halt in his work of association, let us say, for a dream element. As the associated ideas approach closer to the tabooed impulse derivative, the stream of thought becomes hesitant, intervals of absence of ideas become longer, and finally the whole train of ideas comes to a standstill. Clearly one is in proximity to some impediment or barrier. Upon overcoming this difficulty by means of insight or explanation, the patient is able to continue with the association. After several such halts—one finally penetrates the obstruction and gets at the sought for impulse. This work entails a most laborious and devious route to reach the aim. The way thus followed is the one which repression has laid. It varies greatly for different patients. Some required but little distortion, others again were in need of a profound and extensive disguise of their original striving. These difficulties and halts in the work of association are termed resistance, which is clearly a form of repression.

Repression and resistance are different names for the same force; they indicate merely the direction in which the force works. Repression prevents the impulse from reaching the light of day. Resistance prevents the light of day from reaching the impulse. The phenomenon of repression accords one an insight into the composite nature of an ideational representative of an impulse. In it one must distinguish the idea and the energy derived from the impulse. The latter is termed the affect quantity, because when it is separated from the former it usually registers itself as an affect. Thus for example, the affects of anger and fear manifest themselves mainly in proportion as the situation calling them forth does not permit a response in orderly thought or action. The nonharnessing of the impulse energy by means of an idea or a psychomotor activity results in the affect.

There is a considerable difference in the destiny of these two elements, when a psychic process is subjected to repression. The ideational content on being excluded from consciousness ceases thereby to manifest itself, and is thus disposed of. But the quantitative factor—the energy—may be taken care of or distributed in one of three ways. 1. Either it is completely repressed and is rejected to the unconscious, or 2. It appears as some affect, or 3. It manifests itself as unmotivated anxiety.

Since the purpose of repression is to obviate pain and displeasure, it is clear that when there results an unpleasant affect or anxiety that the repression has been unsuccessful, even though the ideational content has been disposed of from consciousness. The hysterical anxiety or the hysterical spell are examples of an unsuccessful repression, in which the affective quantity contiues to manifest itself, despite the fact that the ideational content has been eradicated. There are several, perhaps many ways by which repression may operate; but they all have one feature in common, namely—the separation of the ideational content from the energy factor. Since oblivion is the fate of the ideational content, the whole problem which repression engenders is what is to become of the affect quantity? The modes of disposal of this factor are spoken of as the mechanisms of repression.

We shall illustrate some of them. The mechanism of displacement is a common form in which repression operates in the production of an hysterical phobia. The analysis of the clinical syndrome of an animal phobia reveals the following: A libidinous striving to the father is repressed. The idea father is banished. The emotional quantity changes into anxiety. The idea father is substituted for by a mental presentation of an animal. Hence the hysterical fear of the animal. The symptoms constituting the phobia are a reaction to this fear.

Another mechanism of disposal of the energy quantity is that of conversion—as in conversion hysteria. One of the chief characteristics of a pronounced case of this type is the absence of affect, a remarkable complacency, which Charcot termed *la belle indifferencе des hysteriques.* Here the substitute which takes on the energy change is an organ or a limb, which attracts onto itself and thus localizes the affect. It condenses in itself the various aspects of the repressed psychic process.

The repression in a conversion hysteric with regard to its disposal of the affect is more efficient than in anxiety hysteria, but as regards the fact that it has to maintain a permanent and extensive substitute it is a failure.

Another important mechanism of repression is that of reaction formation. This is best observed in a compulsion neurotic. The predominant feature of such a patient is the ambivalence of his feelings. Hate and love with regard to some object coexist readily in him. Ordinarily one phase of the ambivalent attitude is repressed in early childhood, so that normally there emerges a homogenous feeling attitude. The child displays only the affectionate side of his attachment. The energy of the repressed phase of the striving is withdrawn. The opposite ideational content is chosen and a substitution is thus formed—termed reaction formation.

In the child this reaction formation will manifest itself as overzealousness to please, and later in over conscientiousness to its school work, habits of dress and hygiene, and so forth. Part of the energy of the repressed phase obviously is thus being utilized for the building up of the ego.

This arrangement however may break down in later life. The original repressed ideational content may again become energized and to the fore would come the tabooed phase of the original impulse, giving rise to the primary symptoms of the compulsion neurosis—the sadistic striving.

This new situation would again call for the work of repression, for a second removal of the affective energy and its displacement onto ideational systems of an opposite character to the sadistic urge. The symptoms of social anxiety, conscience fear, self reproaches, and other symptoms, carry on this work. The rejected ideational system against which these efforts are directed is replaced by some insignificant or indifferent matter or object. Hence the incongruity and irrelevance of all these efforts. Reaction formation and displacement are the characteristic mechanisms by which repression manifests itself in compulsion neurosis.

These remarks on repression based upon Freud's original contribution to the subject, aimed to convey an idea of the nature purpose and mode of operation of this important function and the insight one gains through it into the dynamic character of psychic processes. One thing is certain that an appreciation of its significance is indispensable for the understanding of the unconscious. In fact, the concept of repression is a corollary of the concept of the unconscious.[1]

911 Park Avenue.

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[1] This paper is the first of a series of three which will appear in this journal.

A Preliminary Report on Observations on Localized Iris Changes

By SAMUEL P. SOBEL, M.D.,
New York.

For the past four months I have been making an experimental and clinical study of iris changes in disease and trauma. I observed in numerous operations on the dog a localized movement within a definite area of the iris, the area of motion depending upon the organ operated on. The area involved was either triangular or circular, sometimes irregular in shape. The rate of motion varied from one to three times a minute. Many of these experimental operations were performed repeatedly, and the area of motion was always identical, though rate of motion varied somewhat in the different animals.

In humans, motion was also visible, and also repeatedly seen in the same area in the same type of operation. Sometimes no movements were seen, but the formation of new lines in the iris was noticed during the operation. The area in which the motion appeared took on a different appearance after the operation. This always remained permanent, as did the new lines formed.

In disease, discolorations appeared in definite areas, also depending upon site of disease process. These changes will be described in detail after further observation.

Histological studies of the iris show, so far, a redistribution of the iris fibres. Studies for the purpose of determining whether pigment changes occur are also being made.

As I am now in a position to take photographs of the iris, I hope to be able to present with my next report photographic proofs of these iris changes.

35 WEST 110TH STREET.

Report of a Case of Belladonna Poisoning by Topical Application

By HERMAN FRIED, M.D.,
New York.

As cases of belladonna poisoning by local application are unusually rare and as I have recently encountered one in private practice, I present it as a contribution to the somewhat meagre literature of a subject of general interest to the medical profession.

CASE.—Mrs. A., a Turkish Jewess, twenty-eight years old, came to my office, February 2, 1922, for consultation and relief. She complained of jerky pains in the lumbar region. She described it as a stitchlike pain which the slightest movement made unbearable. Any change of position brought forth severe pain. The muscles of her back I found to be tender on pressure. She gave a history of a similar attack two years previously. As there was otherwise nothing apparently abnormal in her condition, I diagnosed the case as myalgia lumbalis and advised applications of heat with hot water bags or electric pads. I also prescribed as a liniment: Tincture of aconite, two drams; tincture of belladonna, four drams; spirit of chloroform, four drams; add sufficient soap liniment to make six ounces. This is to be applied by gently massaging or rubbing the muscles of the back.

About twenty-four hours later I was called to see the patient at her home. I found her in bed, restless, giddy, very talkative, complaining constantly of pain in her throat and persistently trying to get out of bed. Her face was flushed, eyes bright, pupils dilated, tongue coated and dry, fauces and uvula reddened. Her chest was covered with a patchy erythematous rash. Pulse and respiration were markedly accelerated. Rectal temperature was 101° F. At times she was delirious.

Inquiry among the members of her family brought out the information that the liniment had been continually applied to her back until the entire amount called for in the prescription had been consumed. Further investigation established the facts that ordinarily she did not use drugs of any sort and that she had not taken any of the liniment internally. Used externally the whole amount of four drams of belladonna would seem to have been wholly inadequate to produce the severe toxic symptoms that the case then presented. It seemed hardly possible that I could be dealing with a case of belladonna poisoning by local application, and yet the symptoms, taken separately or collectively, pointed unmistakably and exclusively to that diagnosis.

My first thought was morphine as physiological antidote to atropine; but in this case I soon found myself in error. I therefore administered other antidotes both chemical and physiological. Six drops of Lugol's solution hourly and a quarter of a grain of pilocarpine hydrochloride were effective. Close surveillance was kept over the patient for a period of forty-eight hours, by which time her recovery was complete.

It is probable that the mechanical friction of the rubbing contributed materially, as well as the camphor, chloroform and alcohol of the liniment mixture, to the easy absorption of the belladonna by the skin; but some condition of individual idiosyncrasy also must be held, in this case as in some of the others, to account for the unusual severity of the symptoms as well as for the failure of the expected effect of the morphine.

Of the other three cases recorded in the literature of belladonna poisoning by local application the most recent is that of R. K. Ketkar (1). The patient, a man, thirty-five years old, an outpatient, came for swelling and pain of two days' duration in the right side of the scrotum. There was no history of venereal disease, but there was a history of a similar enlargement two or three times several years before. His temperature was slightly above normal; bowels constipated; urine normal. Diagnosis was made of acute orchitis, probably caused by slight local trauma. Epsom salts were given immediately and a diaphoretic mixture three times a day. Tincture of iodine was painted locally and a light scrotal support was employed. The patient returned the same night, complaining of a rather heavy, dragging, unbearable pain in the scrotum. This time glycerine belladonna was applied, and the part properly bandaged.

Next morning about eight o'clock, the patient's tongue had a greenish blue coating; he felt dryness in the mouth and had nausea. He felt drowsy and giddy, his face was flushed, pupils were dilated and feebly reactive to light, and an erythematous rash covered his cheeks, especially marked around the eyes and over the malar bones. He complained of restlessness and thirst, vertigo and staggering, and a desire but inability to micturate and defecate.

The patient's scrotum was immediately cleaned free of all the paints and applications with soap and water, he was given a simple suspensory bandage, and, internally, a diaphoretic and diuretic saline dose. Later, as the bowels did not act and the restlessness persisted, a soapwater enema was employed, followed by an emetic draught of zinc sulphate. The patient was much relieved and frequent draughts of effervescent soda water were all that were then required. The scrotal trouble disappeared altogether by the next day.

Ketkar's conclusions from his case were that the iodine, possibly with a certain amount of scratching, perhaps unknowingly some of the applications introduced into the mouth, and certainly some personal idiosyncrasy were responsible for the toxic effects.

B. G. R. Crawford reports a case (2) of a strongly built, muscular laborer aged thirty-seven. He was seen first at 11 a. m., when he complained of pain in the back. Nothing abnormal as to pulse and temperature was discovered, and, as he was anxious to return to work, a belladonna plaster six by four and a half inches was applied.

At 2 p. m. he was carried in on a stretcher, struggling and held by two men. The skin was harsh, dry and reddened, pupils dilated, pulse 130, respiration 40; he was semiconscious and delirious; his temperature was unobtainable on account of his movements. The plaster was immediately removed and he was admitted to the hospital.

At the hospital he remained in the same condition until 9 p. m., when he quited down and sank into an uneasy sleep. His pulse then was 115, respiration 30, temperature 97.5°. The next morning he was much better, though the tongue and lips were dry and furred and he was still slightly incoherent in speech. He had no recollection of what had occurred. Two days later the only remaining sign was slightly enlarged pupils responding slowly to accommodation. Pulse, respiration and skin condition were normal.

Crawford considered the symtoms to be due directly to an overdose of atropine absorbed from the plaster through the skin in a susceptible subject.

The third authentic case was published by Dr. Allen Starr (3) as having occurred in his practice some ten years before. It differs somewhat from the others in the effect of the poison on the personal idiosyncrasy of the patient, which was in his case mental rather than physiological.

The patient was a young man brought by his brother and suffering from great nervous excitement and exaltation with delusions of wealth and power wholly outside of and beyond any of his experiences and circumstances. The attack had been sudden and greatly alarmed the brother who feared the patient must be immediately confined in an asylum.

The available information was to the effect that the patient had had a severe attack of lumbago the week before, and that a druggist whom he had consulted had recommended plasters. Two large plasters marked belladonna covered his back. He had no physical signs of general paresis. His pupils were widely dilated, but he had no dryness of the throat and no eruption on the skin.

The plasters were removed at once, a long Turkish bath was taken and bromide was prescribed. In forty-eight hours his brother brought him back mentally nearly normal and two days later he was able to return to his ordinary occupation in perfect health. Dr. Starr's conclusions were, as reported, that the sudden development of illusions, delusions, and hallucinations should always arouse a suspicion of toxic psychosis.

In considering and comparing these four cases, the first point to be noted is that the toxic effect of the poison was produced in every case by absorption of the poison through the unbroken skin. Cases of belladonna poisoning are not uncommon, but the port of entry will be found to be usually by way of mouth or of some abrasion or ulceration of the skin; the second is that, although commercially standardized doses only were administered, which under ordinary circumstances do not unfavorably affect most persons, they have entirely different and dissimilar effects upon other persons; the third is that this effect must be attributed to some peculiarity, physical or mental, in the constitution of the person so affected; and fourth that these peculiarities, susceptibilities and idiosyncrasies must be guarded against, if the physician would not invite disaster.

In my own practice, as in that of every medical practitioner, these idiosyncrasies are a source of constant surprise. Alarming symptoms of toxemia and urticaria are often manifested, as in one case following ingestion of blackberries or strawberries. In another after a ten minim dose of turpentine administered in a typhoid faver case, my patient showed marked signs of intoxication, exhilaration, giddiness and urinary irritation. In another case of hereditary syphilis, after an ordinary external application of white precipitate ointment, the patient suffered from nausea, vomiting, bloody diarrhea and collapse, and erysipelatous dermatitis. Often indeed the eruptions are caused by drugs mistaken for some serious skin disturbance. These unhappily cannot always be foreseen.

CONCLUSIONS.

My conclusions from this case and a study of the toxicology of belladonna generally and specifically may be stated as follows:

1. Careful investigation of the personal and family history should be instituted to discover and counteract idiosyncrasy.

2. Morphine should be used with extreme caution, or not used at all.

3. The patient should be kept under uninterrupted supervision; being usually in a state of delirium, injury to himself or others must be guarded against.

4. The treatment should begin with stomach evacuation with a tube or by means of emetics.

5. The best chemical antidote for belladonna poisoning is Lugol's solution in doses of six drops, the frequency being conditioned on the amount of the poison absorbed.

6. Tannic acid in twenty grain doses is an admirable substitute, should Lugol's solution not be available.

7. Pilocarpine hydrochloride may be administered hypodermically in quarter grain doses as physiologically antagonistic to atropine.

8. Supportive treatment with strychnine, caffeine and brandy should be instituted if the pulse becomes weak and respiratory failure imminent.

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20 West 120th Street.

Chronic Ulcerative Colitis and Its Treatment*

By MAX EINHORN, M.D.,
New York,
Visiting Physician to the Lenox Hill Hospital, New York.

Chronic ulcerative colitis has been the subject of much discussion recently. H. Strauss (1) has analyzed this affection in his monograph, *The Sequelæ of Dysentery,* in great detail. He considers many of these cases as the result of dysentery, even if there is no direct proof of this disease at the time the patient presents himself for treatment.

Yeomans (2) has recently published an important paper on chronic ulcerative colitis of indefinite etiology embracing sixty-five cases of his own. Yeomans believes that we have to deal here with an infection causing the inflammatory process. This view is favored by the fever present at the beginning of the disease, the great prostration which occasionally appears during the sickness, and the septic processes (such as arthritis) complicating this affection in its late stages.

Chronic ulcerative colitis is of frequent occurrence and deserves a thorough discussion on account of its frequent relapses and its great resistance to many modes of treatment. The disease process consists, as indicated by the name, in an inflammation of the colon with ulcerations. The latter are encountered in the various parts of the large bowel, but principally in the lower portion of the descending colon.

SYMPTOMS.

The symptoms most frequently found are: numerous watery, mucous evacuations, occasionally with an admixture of blood; rumbling in the abdomen; at times tenesmus; poor appetite; loss of weight; general weakness, and disturbed sleep. Occasionally there appear remissions in the disease process during which the patients suffer less; rarely, however, is there a normal evacuation, although there exists a diminution of diarrheic stools and at times also a better formation of the evacuation. At times again, there are exacerbations of the symptoms, when the stools are watery and bloody and there exists great prostration accompanied occasionally by fever. During such a period the tenesmus is usually present. The disease drags along for many years, during which time the patients are frequently unable to work and are occasionally bedridden.

DIAGNOSIS.

The diagnosis of chronic ulcerative colitis is generally not difficult. Occasionally the history of the case, if it is typical, makes it possible to recognize the disease. Thus, symptoms of intestinal discomfort, frequent diarrhea with mucous and bloody admixtures in the stools, occasional tenesmus, and abdominal colicky pains, justify the diagnosis of chronic ulcerative colitis, provided there is no pulmonary tuberculosis present. Often the symptoms are not sufficiently typical, and the new means of examination can be utilized in order to establish the diagnosis. They are, as everybody well knows, the examination of the rectum with the proctoscope, which shows the inflammation of the mucosa and occasionally small defects of lentil size or a trifle larger, situated in the rectum or sigmoid, and the x ray examination of the colon after a barium enema. By this means in advanced cases contraction of the lumen of the bowel and no haustration of the colon are found.

If the ulcers are situated high up in the colon the proctoscope will of course fail to show them. The examination of the stool, however, will always reveal the presence of blood and pus corpuscles. The prognosis must be guarded on account of the great obstinacy and persistence of the symptoms and also on account of the numerous possible complications.

TREATMENT.

The treatment comprises dietetic, medicinal and mechanical measures. The diet consists in arranging for a sufficient amount of nonirritating foods,

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*Read before the Association of Karlsbad Physicians at Karlsbad, Czechoslovakia, September, 1922.

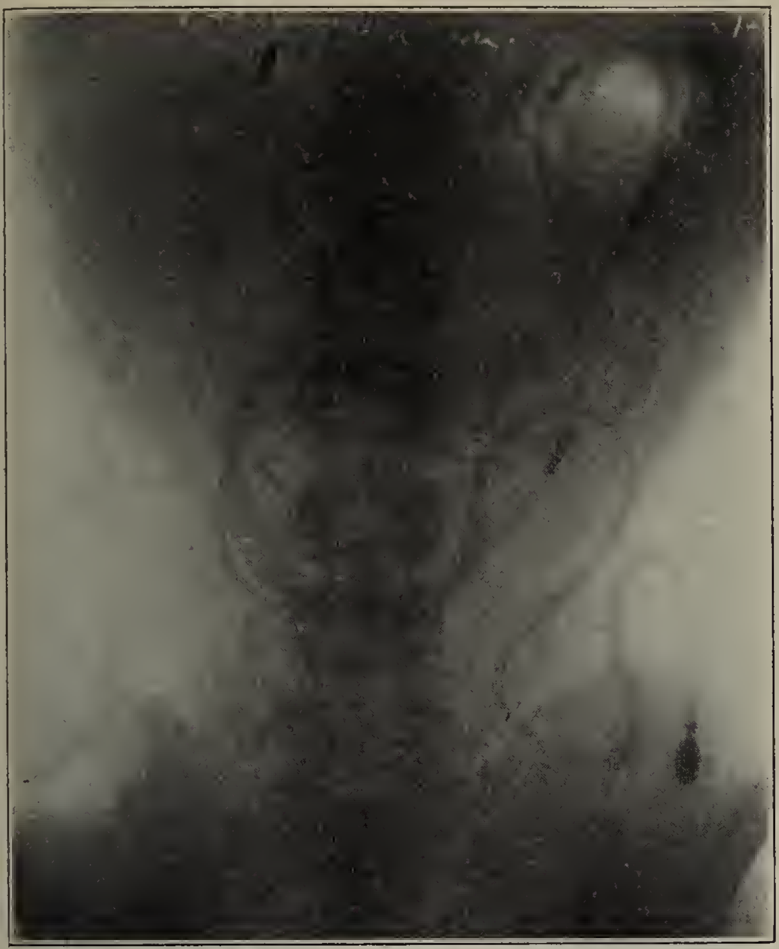

Fig. 1.—January 26, 1922. X ray of abdomen of J. F. The end of the intestinal tube is seen in the small intestine. There is also noticeable a curling up of the intestinal tube in the stomach.

containing very little cellulose matter. Eggs, raw or soft boiled, gruels, tender meat, wheat bread and butter, potatoes (baked or pureéd), tea, cocoa, blueberries, and acorn cocoa, best serve the purpose. Cold beverages, fruits ,and salads should be avoided.

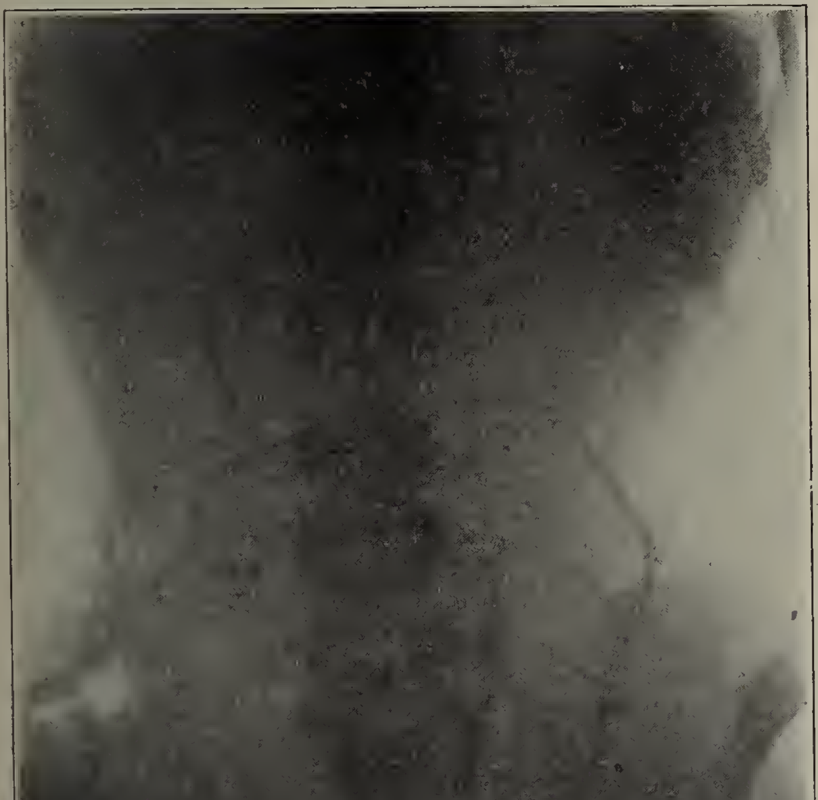

Fig. 2.—January 29, 1922. Same as Fig. 1. The end of the intestinal tube is visible in the latter part of the ileum. There is no curling of the tube in the stomach.

Milk is generally not well borne by these patients. Small quantities may, however, be given a trial, when used as an addition to other foods. After meals the patient should rest one half to one hour. If the patient is improving, vegetables are added to the bill of fare given above.

No matter what kind of a diet is given, it is always necessary to look out for a sufficient amount of nutriment. During an exacerbation of the illness this will, for a certain time, be hardly possible, but in almost every case one soon succeeds in achieving this object. In the general plan of the dietetic régime for any length of time, the principle of sufficient nutrition comes first, and the question of what kind of foods second.

For short periods of time, however, it is possible to apply a scanty (insufficient) rest diet, provided there is some prospect of accomplishing a more rapid recovery (or amelioration) by this socalled rest cure for the intestine. After completing the period of rest one returns quickly to an increased sufficient diet. Frequently the patients are undernourished, and it is necessary to arrange a diet, which would increase the body weight. This can be easily accomplished by instituting frequent meals and giving a good deal of butter. An increase in weight strengthens the whole organism, which is thus enabled to fight the disease more vigorously.

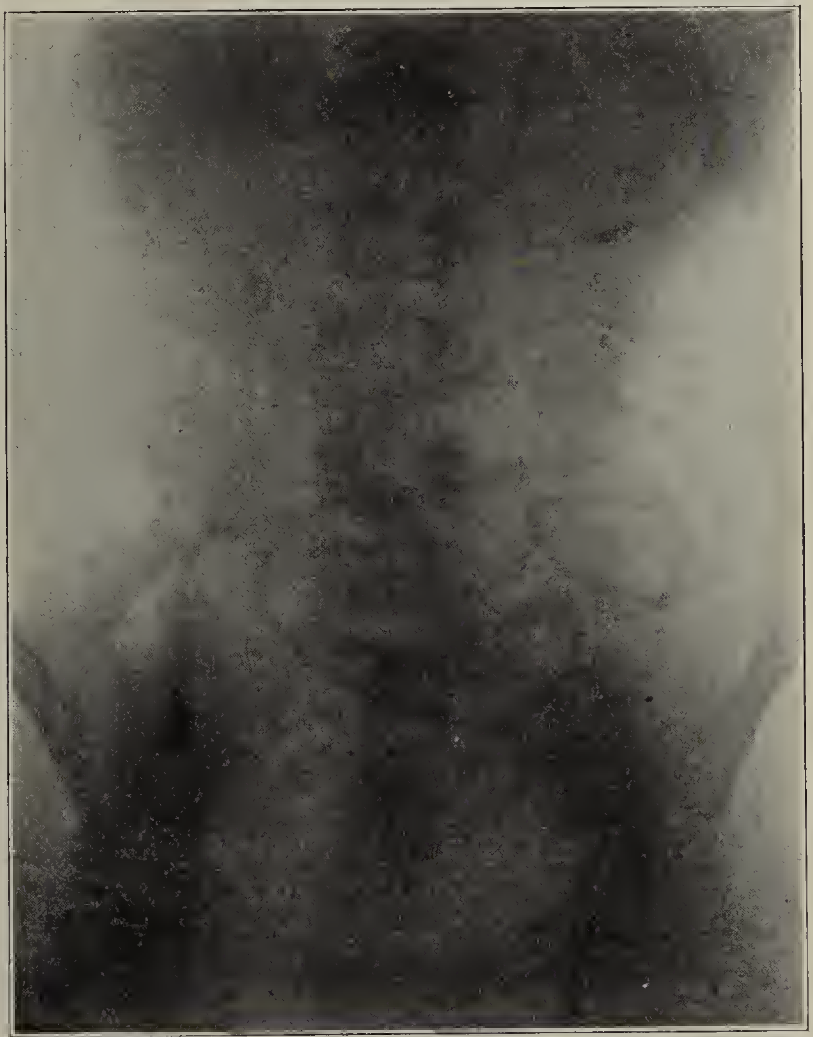

Fig. 3.—January 30, 1922. Same as Fig 1. The end of the intestinal tube is visible in the cecum. The tube shows the course of the entire small intestine.

The medicinal treatment consists, as is well known, in the administration of astringents and absorbents, as well as opiates. While these medicaments are occasionally of use, they prove of no value in many of the severe cases.

In a similar manner, as Schmidt applied agar in conjunction with cascara sagrada for the treatment of constipation, I (3) have used the same vehicle containing astringents in order to combat diarrheas.

The advantage of the medicated agar in the treatment of intestinal affections consists first in having the remedy spread over long portions of the intestine, for the medicament contained in the agar escapes but slowly by osmosis during its forward movement through the digestive tract. Secondly, the agar prevents the fecal matter from becoming too dry, which occasionally happens when astrigents are given, and which leads to renewed irritation of the intestinal mucous membrane.

Practical experience with agar preparations, such as, tannin agar, simaruba agar, gambir agar and myrtill agar, have proved their value in combating ulcerative colitis. One to two teaspoonfuls of these preparations may be given three times daily after meals in water. Whenever there is a possibility of the ulcerative colitis having taken its origin after an attack of amebic dysentery, a combination of the agar astringents with ipecacuanha agar is very useful. In the presence of severe colicky pains lupulin agar is best added to the medicaments mentioned above.

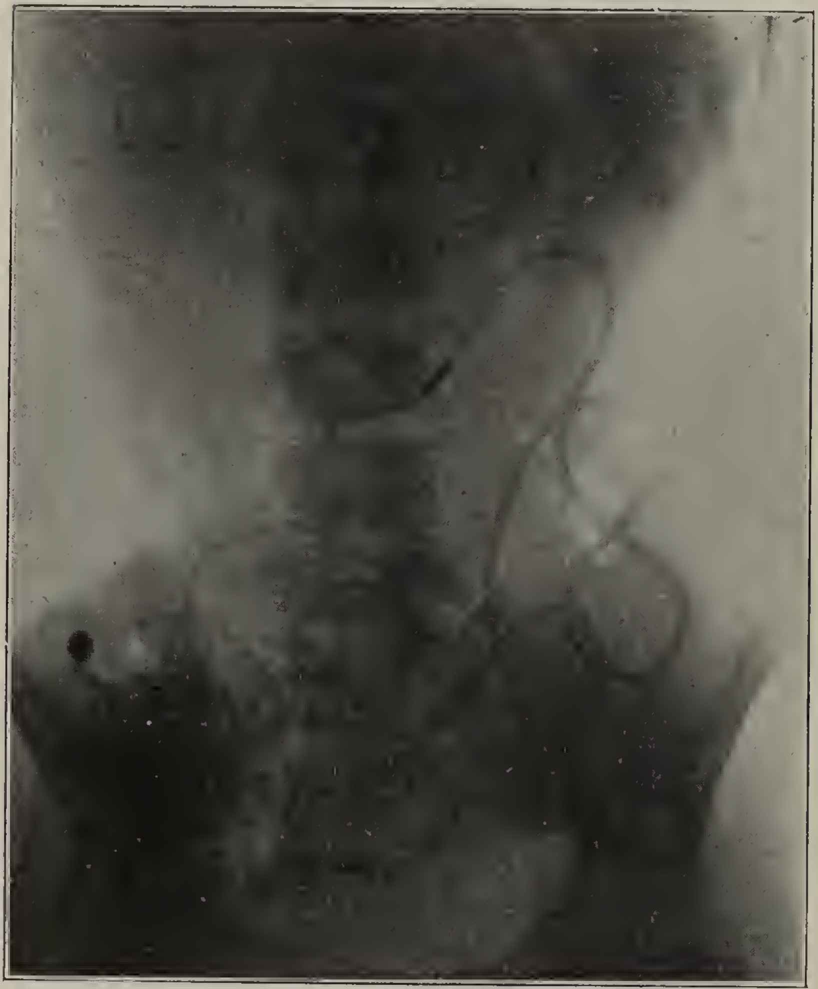

Fig. 4.—February 1, 1922. Same as Fig. 1. The end of the tube is situated in the cecum in a position slightly moving upward along the ascending colon.

I can warmly recommend these agar preparations and would like to say, that since using them I hardly ever find it necessary to prescribe opiates in severe diarrhea, as it is possible to master the situation without them.

LOCAL TREATMENT BY MEANS OF RETENTION ENEMA AND IRRIGATIONS THROUGH THE RECTUM.

For the retention enemas, which may be given in quantities of 150 to 250 c. c., the following media have proved of value; gelatin enemas of ten per cent., alone, or with the addition of adrenalin ten

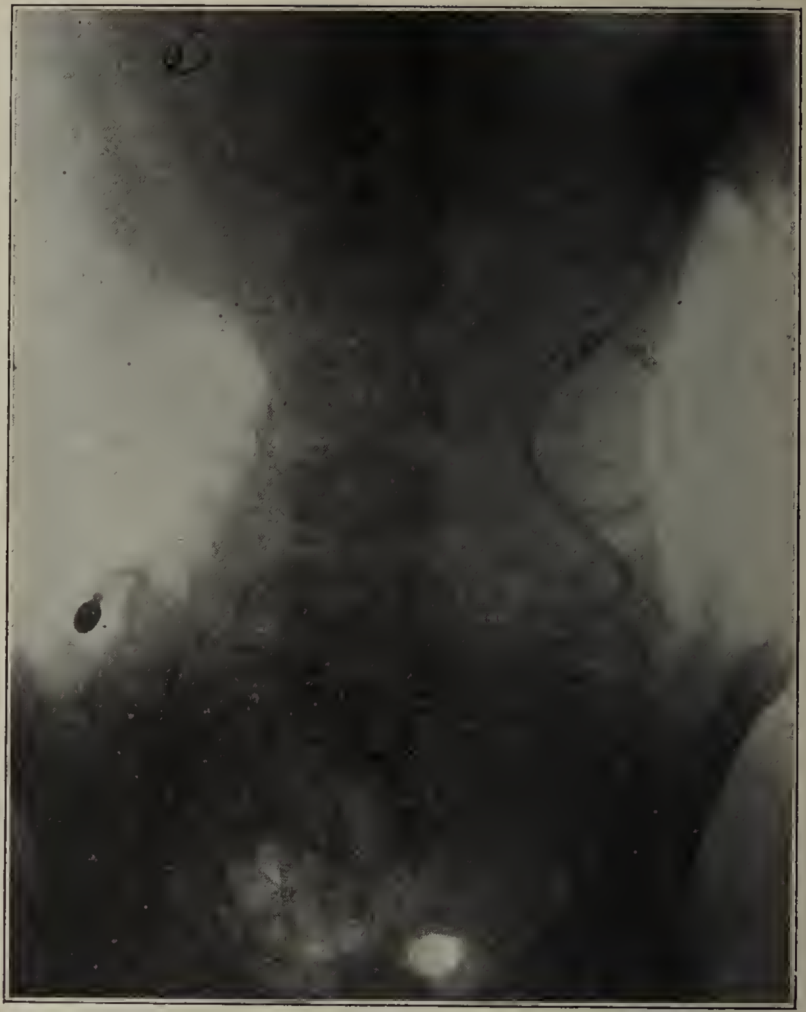

Fig. 5.—February 6, 1922. Same as Fig. 1. After inflating the colon with oxygen gas through the intestinal tube. The ascending colon is nicely filled out by the oxygen gas, pressing the capsule end of the tube downward. The haustræ of the ascending colon are likewise clearly shown.

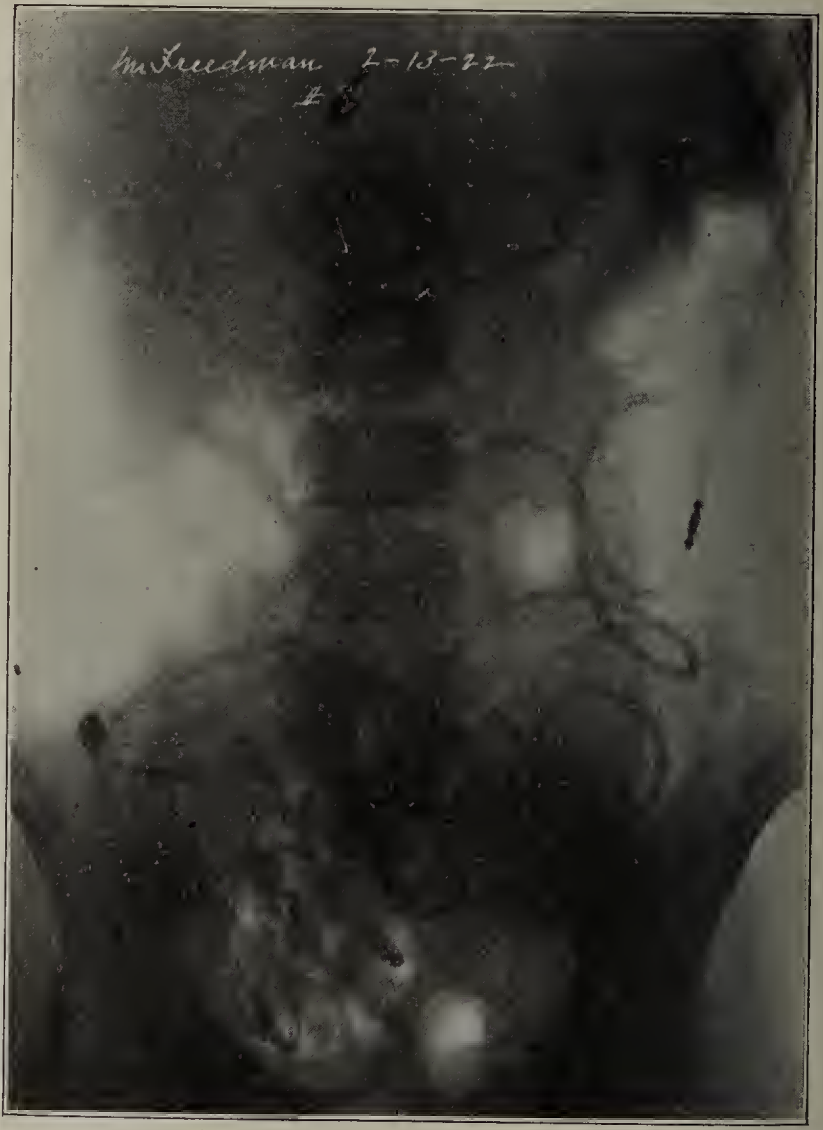

Fig. 6.—February 13, 1922. Same as Fig. 5. A week later, after oxygen inflation. The end of the tube visible in the cecum.

to fifteen drops of the 1:1000 solution); fresh blueberry juice or myrtill extract and water, equal parts, with the addition of a teaspoonful of powdered starch; also bismuth emulsion (subcarbonate of bismuth 25.0; aq. distil., 200.0, mucilage of acacia q. s.) can be advantageously used for this purpose. After a preliminary cleansing of the colon, these small enemas are slowly instilled, at blood temperature, into the rectum and the patient instructed to retain them as long as possible.

For irrigations of the colon through the rectum one may employ weak solutions of argyrol or of tannic acid, camomile decoctions, physiological saline solution, tap water with essence of peppermint (one teaspoonful to a quart), or a one half of one per cent. solution of ichthyol. In the presence of much mucus in the stools irrigations with warm Carlsbad Sprudel water can be given.

In severe cases of ulcerative colitis the surgeons recommend the establishment of an appendicostomy or cecostomy, in order to flush the colon from above, through the newly established opening. This procedure proves in many instances more efficacious than simple irrigations through the rectum.

During the last two or three years I have attempted to avoid this operation by introducing an intestinal tube through the mouth into the cecum. When the tube has reached the latter organ, irrigations can be established through the former, flushing the colon from above downward, as through the appendicostomy opening. The tube is left in place for two or three weeks and is used merely for purposes of treatment, while the nutrition of the patient takes place by mouth in the usual way.

The reports of two cases of ulcerative colitis successfully treated by this method have been published by me not long ago (4 and 5), and I now report another case of this affection, in which the method of treatment, outlined above, was applied.

CASE I.—January 20, 1922, J. F., twenty-three years old, gave the following history: In 1918 the patient was troubled with diarrhea and passed considerable amounts of mucus in the stools. In 1919 he passed some blood. He was treated and relieved of his symptoms for a time, until in September, 1921, he began having bloody stools. Local treatment through a proctoscope brought considerable relief. There was no pain. At this date the bowels moved three or four times a day, blood following the stools which were expelled with considerable effort.

The patient's previous history showed that he had had influenza in 1918, followed by rheumatism. There was no chancre; Wassermann was negative in 1921, his habits were good. He had eaten a general diet until six months ago. The patient lived in Connecticut. Physical examination showed a fairly well nourished man; with a muddy skin and acnelike eruptions over face and chest. Mouth and chest were negative; abdomen, liver, and spleen were not enlarged; cervical and inguinal glands were palpable; urine was negative; blood: hemoglobin, eighty per cent.; red blood cells, 4,000,000; white blood cells, 7,900; polynuclears, seventy-one per cent.; small lymphocytes, twenty-four per cent.; large lymphocytes, four per cent.; transitionals, one per cent.

The duodenal bucket examination was negative; i. e., there was bile below twenty-four inches and no blood stains on the string. The gastric contents revealed hydrochloric acid plus; acidity, 50. Patient complained continuously of slight colicky pains in the abdomen, frequent diarrhea and tenesmus. Examination of the stool showed much mucus, pus corpuscles, and red blood cells; no amebæ or ova of parasites. The proctoscopic examination revealed congestion and reddening of the rectal mucosa and small lentil sized exfoliations of the mucosa, extending toward the sigmoid flexure.

The patient was not improving under the ordinary methods of treatment and I decided to institute flushing the bowel from above by means of the intestinal tube. For this purpose the first joint of the intestinal tube was introduced into the digestive tract on January 23, 1922. On January 24th, the second joint was screwed on and when the latter passed in, instillations of a weak calcium carbonate solution 0.5:1,000) were begun by the drip method through the tube. On January 25th, the third joint of the tube was introduced and on the 29th, the capsule piece of the tube was lodged in the cecum. From then on daily instillations of 100 c. c. of one half of one per cent. mercurochrome solution were added to the flushings of the colon with the calcium carbonate solution, through the tube. This treatment was pursued without interruption up to February 13th. As mentioned above the patient took his nourishment in the usual way by mouth without experiencing any inconvenience from the long tube.

From time to time x ray pictures of the patient were taken, in order to ascertain the position of the tube. From January 29th, to February 13th, the end piece of the tube was always in the cecum, as can be seen from the x ray photographs. Several times insufflation of the colon with oxygen were performed by the tube. Fig. 5 shows patient after filling the large bowel with oxygen gas. The position of the end of the tube (capsule end) in the cecum can now after filling the colon be recognized with greater accuracy.

On February 8th, an attempt was made to perform a direct flushing of the large bowel from above, after a previous cleansing of the colon from fecal masses and after the introduction of a large size rectal tube into the anus. This was successfully done. One could see that the fluid running in from above through the intestinal tube into the cecum appeared directly through the rectal tube, in such a way that a direct continuous irrigation of the entire colon was established. This was repeated several times with the same good result.

During the tube treatment, and notwithstanding that the intestinal sympoms showed a decided improvement, the patient was seized with an attack of acute rheumatism with high fever. The colon irrigations from above and the diet by mouth could, however, go on uninterruptedly during the entire period of fever, without any inconvenience to patient. On February 10th, the patient was free from fever, had no more pain in the joints, and he felt much better also with regard to his intestinal symptoms. He had two evacuations daily with no blood in them.

On February 13th, the distal joint of the intestinal tube was pulled forward, unscrewed and removed.

This was done with slight resistance but no pain to patient. On February 14th, the rest of the tube was withdrawn by the mouth. The intestinal tube had been in the digestive tract of this patient for about three weeks, and the colon irrigations through the cecum had been performed for fourteen days. The patient showed decided improvement.

As in the former two cases, this case shows that the appendicostomy or cecostomy operation for the purpose of bowel irrigations can be obviated by the intestinal tube, which certainly signifies a great advantage for the patient.

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20 EAST SIXTY-THIRD STREET.

The Rôle of Focal Infection in Disease

By SYDNEY PERN, F.A.C.S., L.R.C.P., Lond.,
Melbourne, Victoria.

At the present time one of the profoundest advancements in medicine is occurring. This is destined to play a part rivalling that brought about by the work of Lister. The condition referred to is the rôle of focal infections. Although much work has been done in this direction, the extent to which such infections are responsible for damage to man is not fully grasped.

Going back into the times when life began and considering the possibilities of damage to cell life in those times, we come to the following conclusions. That outside of the invasion of one living organism by another, for purposes of protection, habitation, or nourishment, there was little that could hurt a multicellular animal. In certain cases the invasion may be advantageous to the host. It has recently been suggested that the Bacillus coli is alone capable of splitting up tryptophan into indol and skatol, thereby making the indol available to combine with the iodine to form Kendal's thyroxin. But the majority of cases show detriment to the host. The only other harmful conditions are extremes of temperature and light, lack or excess of water, deficiencies of the necessaries of life, absorption of some toxic element, and, possibly, electrical phenomena. Are these conditions in any way altered at the present day? It does not appear so.

There are many diseases of unknown causation assailing the human body. All disease is either hypofunction or hyperfunction of body tissue; hypofunction being due to destruction, hyperfunction to irritation. If the effects of temperature, dryness, deficiencies, and toxic elements are excluded we have to fall back upon the presence of an invading organism as the most common cause of damage to cell life. The human being is infested with bacteria. Because it is so, does not necessarily mean that it is natural. They may be on the surface or in the body cavities and as such may be harmless unless they gain access to the body proper. In many cases these invaders are harmless, in many detrimental to existence. At first appearance it seems too overwhelming a problem to rid our bodies of these unwelcome invaders. It is generally recognized that man's span of life and usefulness is invariably cut short by gradual deterioration of his tissues, brought about by the presence of toxins, either of bacterial origin or indirectly, formed by faulty metabolism. If these could be eliminated man would live to old age unimpaired in faculties and vigor. Can this Golden Age be arrived at? If not, what can be done to help it on the way?

Bacteria have different ways of attacking the body and the body has different ways of defending itself against them. Invading organisms may be roughly divided into three groups. Those that invade the body, multiply freely, and are either wiped out or destroy the host. Measles is an example. These often give lasting immunity. Those that live and multiply within the body proper and gradually destroy the host or are slowly eliminated, as, for example, the bacteria of syphilis and tuberculosis. Those that live and multiply in close contact with the body or in sheltered areas from whence they can poison the body with toxins, gain direct entrance and are destroyed. The latter do not multiply indiscriminately within the body, except where they are able to set up another sheltered barrier. These by their constant invasion so reduce the defense mechanisms that they do great damage before they are killed off. If they were not killed or eliminated they would of necessity multiply and overwhelm the host. Such an instance is seen in the supervention of miliary tubercle on a long standing case of phthisis.

Mobilization of the defensive forces in many cases gives the first indication of disease. In other cases there is direct cell spoiling of highly specialized tissues without signs of mobilization. Hence hyperfunction and hypofunction of tissues constitute disease.

As stated the majority of bacterial invasions are wiped out and there is an end of them, with the result that the body is soon able to repair the damage done, and is as good as ever.

It is to the other type mentioned where bacteria live and multiply in a safe retreat year after year that our attention is seriously drawn. These bacteria are constantly pouring toxins into the system, sending raiding forces into the blood and lymphatic streams whose bactericidal powers are steadily reduced by constant invasion. They are attracted to tissues for which they have a selective affinity. On being met by resistive forces they eventually succumb. Infection of this nature is sapping the vitality and destroying the tissues of the majority of men. What are these infections? Where are they? What organisms are responsible?

The infections we now call focal infections. So much has been written about them that it is needless to dwell further upon their designation. Their localization is also known. The organisms responsible vary, the species does not matter so much; it is the method of operating that counts. Of them all perhaps the streptococcus group stands out supreme. From the work of Rosenow and others one must conclude that many forms are the same organism at different stages of transmutability.

It is a commonly accepted fact that streptococci and other organisms may be found almost universally in the mouth and tonsils.

In these locations the organisms are outside of the body proper and may be more or less harmless. We know that the digestive powers of the stomach are capable of dealing with most organisms that are swallowed; we also know that invasion takes place through the tonsils into the blood and lymphatic stream. Many have been led to look upon the tonsillar crypts as incubating chambers by which the body gains immunity. This is correct up to a certain point and explains why, when these organisms gain an entrance, they frequently do not produce acute but chronic conditions leading to mild response. Incubation of bacteria may proceed for years within the tonsillar crypts yet the defensive forces of the body may be quite able to deal with them on gaining entrance. As these forces are gradually reduced, the organisms steadily gain the upper hand. Toxins of bacteria act locally at a distance. Most frequently they act locally and it largely depends on the kind of tissue invaded as to the nature of the response. In highly organized tissue there is usually a breaking down of cells with little or no reproduction, whereas in connective tissue and other less specialized types there is irritation with overgrowth. This is well illustrated in syphilis, but not so fully recognized in other bacterial infections. To illustrate the action of bacterial toxins unassociated with usually recognized pathological changes I quote the following (*Medical Review,* Vol. xxv, No. 4, p. 96):

Prof. R. Massini writes concerning the results of an autopsy on a patient dying from myocarditis. A woman, aged sixty-eight years, had suffered for some time from symptoms of chronic myocarditis, but none of tuberculosis. The necropsy showed chronic, fibrous myocarditis, emphysema and edema of the lungs, mucopurulent bronchitis, fatty liver and congestion of the abdominal organs. Microscopical examination of the heart muscles showed badly staining nuclei and small granules of fat scattered throughout the muscle cells. Between them was much connective tissue. In some parts of the wall of the heart complete necrosis of the muscle was demonstrated, and near the surface of the heart the muscle fibres were infiltrated by leucocytes and showed fatty degeneration. There were no signs of pericarditis and in no organ were any changes found characteristic of tuberculosis. But guineapigs inoculated with heart muscle developed extensive tuberculosis, and the tubercle bacilli obtained in pure culture from the liver, mesenteric glands and an abscess in the abdominal wall of one of the guinea-pigs showed characteristics of the human type. The significance of this case is its demonstration that an apparently "ordinary" chronic myocarditis may be due to the tubercle bacillus, although none of the changes hitherto considered characteristic of tuberculosis were found. In the degeneration of these highly specialized tissues, pathological findings do not show inflammatory changes, and accordingly, doubt has been cast as to the cause of breaking down. Organs are largely composed of two or more types of tissue: A highly specialized parenchymatous tissue and a less specialized interstitial tissue. If the former is picked out there is usually cell destruction, if the latter, there is overgrowth. This is well illustrated in kidney and liver conditions. Such conditions as diabetes, pernicious anemia, leucemia, etc., are beginning to come under the ban of the infections, not from their pathological conditions, but by clinical findings, their constant association with infections, and the benefit derived by their removal.

Have we any right to assume any tissue in the body immune from infection and cell degeneration caused by their toxins? We recognize the ability of the spironema in this respect and must logically concede it to other organisms, particularly the streptococcus.

When it is borne in mind that in the majority of chronic infections, with the exception of syphilis and tuberculosis, the organism does not live and multiply in the invaded tissues. If the patient is going to survive, their finding and culture will be difficult, as their staining properties will be greatly impaired by the attacks of phagocytes and lysins. The late work of Rosenow, showing that under certain conditions the streptococcus takes on anaerobic methods of living and so cannot be grown under ordinary methods of culture, helps to explain much and opens up a great field for the explanation of what was obscure before. With the knowledge and experience already gained as to the action of these organisms in other parts of the body, must we not concede the same to the nervous system? The streptococcus must be regarded on the same plane as the spironema, but with this difference: The spironema if left alone multiplies indefinitely in the invaded tissues. The streptococcus cannot, if the patient is going to survive. That they gain access and do damage to the nervous system must be patent. Cases of myelitis and other spinal cord conditions, which are not specific or tuberculous, are not uncommon. Disseminated sclerosis is already being accepted as inflammatory. Dementia præcox and other forms of insanity are being proved clinically to be associated with these infections and cured by their removal. Personally I have seen some complete cures of epilepsy, following removal of focal infections, without any other treatment. One cannot expect cures in cases where much damage has already been done and fibrous tissue laid down. One often sees definite specific epilepsy cured or greatly benefited by specific treatment. These and many other factors make us pause and consider whether conditions such as paralysis agitans and obscure degenerations may not owe their cause to the same factors. We find diabetes responding in a marvelous way to the clearing up of focal infections, yet there is nothing pathological to support the infective theory, nothing but cell degeneration. We know that these cases are often specific and respond to appropriate treatment. Should we not test all doubtful cases by this acid test before going further?

The most important factor we have to recognize is that nearly all humanity is already infected with the streptococcus or allied organisms living under the conditions portrayed. The infection with these organisms is so prevalent that it has been looked upon as natural. Over sixty per cent. of all cases seeking medical treatment in big hospitals are suffering from diseases directly due to these infections. Three quarters of humanity are suffering from diseases that are easily preventable. They need not exist and will not in the near future. That is why I say we are now in a period of time in which the profoundest advancement is being made in medicine. As the largest breeding grounds for these invaders are located in the tonsils, teeth and nasal accessory sinuses, our attention must be directed thither.

So much has been written on these subjects that I shall emphasize only a few points. Tonsillar infection is almost universal. Every mother with infected tonsils passes it on to her family. If one child is infected all the rest are. Uninfected tonsils in the adult do not exist, unless they are completely atrophied and show no crypts, in which case the infection has died out. If tonsils are not infected they atrophy at an early age and there is nothing left for bacteria to multiply in. Every crypt is an incubating chamber from which invasion may take place and toxins be absorbed, but into which not sufficient of the defensive forces can pass to eradicate the organisms. Nasal infections are frequently secondary to tonsillar infections. Dental caries is often a sequel to tonsillar infection. Occasionally dental caries has been seen to cease abruptly after the removal of infected tonsils. Dental caries alone is not so dangerous as the result of dental work in the past. The writings of Rosenow are illuminating on this point and should be referred to. Many believe that in pyorrhea, as long as all visible pus and signs of inflammation are cleared up, the complaint is ended. One can easily realize that drugs cannot possibly penetrate by the paths taken by bacteria along the peridental membrane, and that in the majority of cases only extraction can eradicate the bacteria completely. The conclusions to be drawn are that until we can clean up this generation of focal infections, we must part with our teeth once they become infected, rather than face the dangers following closed infection at the apices. The almost universal expression of people who have had their teeth out is "I wish I had had them out before." There is no regret.

Most of the endocrine system is employed in the mechanism of defense; the thyroid, adrenals and pituitary, as well as the sympathetic nervous system. Constant overactivity for years in the presence of infections leads to their gradual failure. A case of exophthalmic goitre is an object lesson. Since the metabolism of life depends largely on the integrity of the endocrine system, it is not to be wondered at that men are old at sixty in the presence of chronic infections. The great wonder is that the body has such marvelous powers of recuperation and that it can go on so long in spite of all the evils which beset it. As long as repair keeps pace with destruction, one may be apparently sound. It is only when destruction outsteps repair that we show signs of the ravages being made. With most of our organs Nature has been unduly lavish. We have three or four times the amount of tissue necessary. Half of one healthy kidney is sufficient to carry on the normal functions of the body. It is not until so much damage has been done that inefficiency begins, that we are aware of any damage at all. By that time there has been great destruction.

In regard to bowel infections, although the intestine teems with bacteria, it has not been my experience that much damage originates from that source, unless there is gross stasis. It is not uncommon for the bowel to be infected from some focal infection; colitis is occasionally of this origin. Appendicitis is probably more frequently due to metastasis than to any other cause, and in mild cases the removal of the focal infection should be tried before resorting to operation. Gallbladders, although in many cases infected from focal infections, become eventually focal infections themselves. Many of the failures in the cure of diseases due to these infections can eventually be traced to some such hidden foci.

There is another aspect in the danger of focal infections. A family of children catches cold, one or two have bronchopneumonia and possibly one has empyema. All have had the same initial infection. The cause of the bronchopneumonia and empyema are not the direct result of the colds, but of a flare up of the chronic tonsillar infection. The initial infection of the cold temporarily lowered their resistance to the other organisms. Exactly the same reasoning must be applied to the secondary infections in the late influenza epidemic. A child with infected tonsils who catches scarlet fever will run a far greater danger than one without. The extent of these infections and the infinite possibilities of damage due to them overwhelms every serious thinker. Syphilis is an object lesson, also tuberculosis, but whereas only a certain proportion of the population is infected with syphilis and tuberculosis, nearly the whole is infected with some focal infection. Outside of syphilis and tuberculosis focal infections are practically the only source of gross damage to the human body in temperate climes.

If we recognize the ability of these organisms to destroy highly specialized cells and to cause over growth in those less highly specialized, we must consider the possible part played in the production of unlimited overgrowth. When we find signs of cell response in any tissue, be it brain, nerves, bloodvessels, or any tissue capable of reproduction, we ought first to consider the possibility of its being due to the presence of some organism. It is only necessary for the body to have lost its powers of defense against a certain organism of low virulence, which has a selective affinity for a tissue and the powers of reproduction to get unlimited overgrowth.

In summing up one arrives at these conclusions: Mankind is almost universally infected with a group of organisms, living in sheltered places, yet invading the body and causing damage by their toxins. These processes can go on for the best part of a lifetime. The defense mechanisms may be able to deal with the invasions for varying periods of time, depending on the virulence of the organism and the powers of the defense mechanisms. Highly specialized tissues with a limited power of reproduction or none at all are slowly destroyed, while tissues of the connective and epithelial type are caused to reproduce by irritation. No body tissue is immune. The breeding grounds of these organisms, fortunately for mankind, in the majority of cases, are such that they can be easily cleaned out. These infections are capable of doing as much damage as syphilis and in many respects the results are very similar. They are a bigger menace to the community than syphilis, because they are tolerated. Clearing up of these infections is slowly taking place, with a view to relieving people already damaged. But consider what it would mean to the coming generation if such infections could be entirely prevented.

16 Collins Street.

Reinfection of Tonsillar Remnants After Incomplete Tonsillectomy

A Report of Four Cases

By JOHN A. GLASSBURG, M.D.,
New York,

Assistant Attending Laryngologist and Otologist, New York City Children's Hospital; Surgeon, Ear, Nose and Throat, Stuyvesant Polyclinic; Assistant Visiting Laryngologist, St. Joseph's Hospital.

Although it is the common experience of general practitioners as well as of rhinolaryngologists to find remnants of tonsillar tissue after incomplete tonsillectomy, reports of the deleterious results of such incomplete operations are scant in the literature. Undoubtedly the day of the tonsillotomy is past, and the rank and file, as well as the vast majority of the authorities, advise and practise complete enucleation of the tonsil. Therefore, with the few exceptions in the cases of those operators who still deliberately cling to the partial removal of the tonsil, tonsillotomy today means a tonsillectomy incompletely performed. Of course, there are certain cases wherein, because of sudden supervening conditions, such as hemorrhage, asphyxiation, or shock, the operation is purposely hurried, a termination is rapidly sought, and the complete removal of the tonsils is necessarily abandoned. These emergencies, however, are rare and if caution and a certain degree of skill are shown, especially if time is given to the inspection of the cavities after the removal, the tonsils as a rule can be enucleated *in toto*. The rapid grandstand play removal without inspection of the cavities cannot be too severely condemned, both from the viewpoint of tonsillar remnants and the possibility of a subsequent hemorrhage from a small spurting vessel that may need ligation. To emphasize the necessity of this painstaking skill, and the examination of the cavities for small pieces after the removal of the tonsils, the four cases constituting this paper are reported.

Case I.—Jane M., twenty-four years old, since childhood had been suffering every winter with acute tonsillitis, getting three to four attacks during the season. On January 10, 1919, she was operated on. According to her statement local anesthesia was employed and she felt well for four months and then got a sore throat but only on the left side. The attack lasted the usual week, during which she applied cold compresses, took aspirin, and gargled with the old reliable "yellow throat mixture." During the following summer she was well, but with the approach of autumn she began getting frequent attacks of sore throat, but always limited to the left side. I first saw her during one of these attacks which was sufficiently virulent to confine her in bed with a temperature of 103°.

Examination of the throat showed a piece of tonsil tissue about the size of a walnut at the inferior pole of the left tonsillar cavity. Upon this piece of tonsil was the typical yellowish patch. The rest of the cavity as well as the right cavity was perfectly clear. I waited for the subsidence of all the acute symptoms, and on November 20, 1920, under local anesthesia, removed the offending piece of tonsil. Since then, to the present day, there has been no recurrence of the tonsillitis.

Case II.—Alfred P., eighteen years old, suffered for about four years from indefinite pains in the joints. In addition, he had recurrent attacks of acute tonsillitis every fall and winter since babyhood. He had gone to an orthopedic clinic and after elimination of all possible foci of infection, the tonsils were removed. General anesthesia was employed. The operation was done in July, just after the close of school. The boy felt perfectly well until the autumn, when the sore throat and the articular pains returned. During one of these attacks the throat condition became so severe that the boy could not open his mouth more than three quarters of an inch. It was during this attack that I first saw him and found a peritonsillar abscess on the left side, a piece of tonsil about the size of a small hickory nut at the superior pole of the left cavity, and two small pieces of the tonsil, one at the inferior and one at the superior pole of the right cavity. The remnant in the left cavity was an angry red. The abscess was opened and when the acute symptoms subsided and the throat returned to normal, the tonsillar remnants were carefully dissected and removed. It is now about two years and the boy has had no more throat infections and the arthritic pains have disappeared.

Case III.—Angelina S., twelve years old, gave a typical history of tonsillitis followed by arthritis and terminating in endocarditis. This had been going on for several years. An exact history could not be obtained because of the mentality of the parents who were illiterate Italians of the poor peasant class, who could not speak a word of English, nor could they make themselves understood through an interpreter. All that could be gathered was that the child would get frequent sore throats, that she had attacks of pain in the joints associated with high fever, and that the doctor had once told the mother that the child had rheumatism of the heart. Three years ago she had had her tonsils removed and the mother stated there had been a great loss of blood immediately after the operation, and a hemorrhage six hours later, which necessitated the doctor's staying with the child for two hours, during which time he applied various instruments to the throat. It could not be ascertained whether a stitch had been taken in the tonsil. After the operation the child had no more attacks of sore throat, but the rheumatic attacks persisted and she complained of a constant sticking in the right side of her throat.

The child was referred by the family physician who had discovered a peculiar condition of the throat. This condition consisted of adherent pillars on the right side enclosing a small ballshaped mass the size of a walnut, and a small piece of tonsillar tissue at about the middle of the right cavity. The child was anesthetized, the pillars were dissected and separated and a piece of tonsil was found between them. This mass and the mass on the right side were removed. The "sticking" in the throat which was due to the pull of the adherent pillars was completely relieved. The child was under the observation of her physician for one and a half years, during which time she did not have a single attack of acute arthritis, though she would complain of occasional pains in the joints, especially during rainy weather. The endocarditis persisted.

These four cases have been selected because of the obviousness of the cause and effect in each instance. The author, however, has seen a great many cases wherein remnants of tonsils have been left over after tonsillectomy. The majority of these remnants are at the inferior pole of the tonsillar cavity. This is probably due to the difficulty sometimes experienced in separating and dissecting the tonsil from the pillar at this point, for the plica tonsillaris which covers the anterior inferior portion of the tonsil is often attached to the tonsil at this particular site. If Hurd's separator is employed and the anterior pillar gently drawn away, the cavity can be readily inspected and any piece of tonsil tissue adherent to the plica easily removed. Though many of the patients who have tonsillar remnants do not have any subsequent throat infections, the fact that some do, as demonstrated by the cases reported, is sufficient warrant to make an appeal for the complete enucleation of the tonsil.

231 East Eleventh Street.

The report of another case will appear in the author's reprints.

Æsculapius and Izaak Walton*

Poor Fish and What He Got for His Pains

By HE WHO GETS SLAPPED, A.M., M.D., Ph.D.

Recently I went a fishing. I was gone a long time and fished unremittingly for protracted periods. It was an old and wellknown fishing ground. I had been going there for thirty years. In a manner of speaking, it was a family fishing place, although out on the open and the deep sea, and I, my fathers, and their forefathers, had been casting their lines into this great sea and the catch had never ceased and its variety never ending. Each time I go fishing there I get a basket full of new things and although we have a long series of family traditions about the possibilities of the catch, each trip rewards us with something apparently never caught before.

I remember on the occasion of my recent trip I brought back a lot of those queer fish. There was a large meeting of my friends, friends in the sense of the word that they all claimed to be ardent fishermen like myself. In my enthusiasm I told them what a fine catch I had, and invited them to see my catch, these queer fish of mine. This lot, I told them, were only some selected from the others which I thought would interest them, the codfish, and the mackerel, the squids and the bluefish, the shad and the bass, why they were old acquaintances, I had left those behind; we had used them for our daily consumption —they kept us alive on our trips—but here were some rare specimens.

Even before opening my basket some noses were going up and their owners were edging themselves out to the edge of the crowd. "What a smell they have! How unpleasant! we have more sensitive noses than the rest of you fellows; you can stay if you like but, excuse us! Besides there is a rubber of bridge to be finished and we need the money!"

Certain eyes were watering, too, the salt water I suppose—a sort of contagious magic, or would some of the modern wiseones just put their thumbs in their buttonholes and say—"suggestion, you know"—at any rate, with their watery eyes and their sniffly noses, it became not so pleasant for them to look—at least not for long, and so they soon excused themselves—they had other fish to fry that came from fresh water, and moreover such did not seem to have the same effect upon their sensibilities. A protein sensitization, undoubtedly of some occult type, I presume, would be the orthodox explanation of the difficulty.

Finally a loud guffaw came from one corner of the group: "My word, Æscy!" (the sch sound was pronounced with that soft accent, as in shutter, instead of sch as in school, as perhaps my more pedagogic purity might have liked), "you don't mean to hoodwink us like this, do you?" Shad evidently was the conditional reflex that led to his socalled complex as those Vienna fellows, those Freudians, would say.

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*A family physician and well known fisherman of bygone days.

"Fish! My word! Æscy thinks he can put the scales on our eyes! Why he's manufactured these; he never went fishing at all!" and in righteous indignation and with a curl of contempt on their lips, that dimly betokened how badly they felt that someone would tamper with their sense of the infallible, another quarter of the company retired to play the old game, newly christened Fatu Liva (1), that came from the Filbert Islands, discovered by that intrepid crew on the Cruise of the Kava. The nest of Fatu Liva that was a real thing—this—what a fakir old Æscy was! Who would have guessed it, and such a plausible story that about the great time they had, and the family fishing ground. But they were wise. They were practical men. What a wonderful bird it was that laid square eggs with black dots on them all different, from one to six.

But what a rustling there was as they turned away. They had me on the griddle there for a while. It was in vain that I explained how simple the whole thing was—"here they are, I just brought home a few little things that interested and amused me, and here they are. Of course, I hardly would have brought them if everybody knew all about them, although," and here I know I was malicious—"I have *occasionally*" —I said this last word loudly, as it were to soften the after coming sting, "I have observed that the only thing you may be interested in is something that everybody knows all about. I imagine it gives us all courage to talk about what we know, when we know the other fellow told us about it—it helps us both, to repeat to each other what we have told each other; a kind of a mutual selfappreciation society." To dispel a gathering sense of disapproval of my levity, I put my arm on their shoulders, in a friendly way, and gathered them around the table on which my prizes were gathered. I felt at the time it was selfish, that perhaps they really were not interested in my catch. Why should they be? for were they not all falling into small groups explaining just what kind of flies they used in August; or what a great help a cloudy day was for bass; or how they never fished quite so deep; they never had brought up anything but suckers and—the rapid side glance had a wicked motion, and their voices dropped a bit at the name of this nondescript fish of many coats and colors. And they argued and argued, now coolly, now with warmth. The dance of the atoms as portrayed by our chemical friends had nothing on the movements of the remaining groups as they almost bounced away from my specimens, in their own argumentative preoccupations, rather than walking up to them and turning the things over.

Again an inkling of my own stupidity came into my mind. "Of course!" I said to myself, and then in an ameliorating way said: "Cat fish? sure! barks? cert! You should grab them like this," and I proceeded to take one up, but my ruse was suspected. They were not ready to look at the fish. They knew all about the precautions to be taken in handling cat fish.

Again I started. There was a bucket of sand, nice yellow sand, and now I announced, "You get your hands full of sand, and the eels, the slippery devils." Now I was in for it. Slippery devils, dialectic I think the logicians call it. For hours the arguments waxed and waned; the illogical qualities of all hard propositions (barbed cat fish) and all pragmatic hypotheses—these I learned were the philosophical correlates of what I in my more simple way was calling eels. "But! look at them! here they are! I will even consent to announce they have nothing in common with catfish, and only the faintest resemblance to eels. Slippery, no doubt, that I can't deny, and with dangerous horns, even a novice might see that, but let's stop all this cackle about what isn't and see if we can get anywhere with what is."

Even then, blind fish that I was, I could not see that perhaps after all no one in the crowd had ever seen these particular specimens, and I was more foolish in urging them to take a look at the unknown than they were in refusing. A jingle came into my consciousness: "Be not the first by whom the new is tried, nor yet the last to leave the old aside!" I know that phrases, like old fogies, morons, stupids, were all too ready to leap to my lips. Probably, I dimly guessed, as a defence for my wounded vanity, for now the groups were getting further and further away from the table, each discussing about fish they had seen and apparently they seemed to be interested—old, old timers, certainly were among the last to leave the old aside. A discomforting thought! How old the new, how new the old! and smiling through the sarcastic muscular distortion—it must have been really diabolic seen in the mirror of the eternal—with cajoling phrases I sought to enlist their interest in my catch by the old trick of assembling the resemblances. This might make them my friends. If they could rerecognize what they already knew. Then it was no longer new, but old, and presto, shades of Heraclitus, Protagoras and Hegel! I had resolved the irreconcilable, opposites were equal, and they would believe that I really had been fishing. This was of the catch, and they need not fear its newness. Novelty would not be dangerous, and I would be happy.

No! blind fool that I was, even now they avoided looking at the catch.

Persuaded, as my excitement while fishing had convinced me, here were new fishing depths—here were things catchable—even if different, and yet not so very different; even getting ready to knock my friends down if they did not look—surely the best method possible to defeat any cometogetherness—what better procedure now than to play the great old camouflage, shrug the shoulders, walk away. There they are you know! nothing much! Just a few little curiosities! Not so very important!

"Interested?"

No? "Sensible old chap." "Yes! Oh, I don't know. Why waste your time?" "Speculation! a quagmire, any old fool can speculate; a losing game, stick to facts, my boy, solid facts." "Why you know that editorial in the *Journal of the A. M. A.?* Now there you have it." "Facts. Everybody agrees about that!

Bergson? What did he say, you ask? "When everybody agrees about a thing it is dead, no longer evolving, but passé." Why, he's a silly Frenchman! All Frenchmen are silly. Besides they have such disgusting toilets on the Boulevards, right in plain sight! "No! Stick to the English, they are sound, very sound." "Why they have castles in the same family for a thousand years." "Believe me that right little, tight little island stuff!"

Yes, I mused to myself, keep away from the table, don't touch on the matter! Get your emotional rapport. People are children. Amuse them; flatter them. Then perhaps they will look at your fish, a side glance it may be, even that will act on the memory, and finally the resistance will wear away, and maybe one day they will pick up one of your old fish anyhow and say: "Great." "Why I remember some thirty years ago I got one of those." "It was new at the time, but dear me, no one believed me." "You know, I was the first man really ever to find this particular specimen." "Believe me, it made a furore in its day, but like everything else, forgotten, and here Æscy turns it up in his catch and pretends it is new." "Why old Homer knew all about that." He just took it out of my mouth as he told us the Kipling version of it:

When 'Omer smote his bloomin' lyre
He'd heard folks sing by land and sea
And what he found and most admired
He took and used like you and me.

This was all he could remember, and musingly, in quiet mood, I went on:

The market girls an' fishermen,
The shepherds an' the sailors, too,
They 'eard old songs turn up again,
But kep' it quiet—same as you.

They knew 'e stole; 'e knew they knowed.
They didn't tell, nor make a fuss,
But winked at 'Omer down the road,
An' 'e winked back—the same as us!

How I then wished I might have been as blind as Homer, maybe then I might see.

No one had looked at the catch. They all came it is true, but one by one, in groups, in twos and threes and singly, each to his own, and bitterness crept into the heart. "What's the use?" "I'll go to the market place where people are hungry"; "I'll tickle the palate for novelty"; "I'll show them and reap golden rewards." Even then, my blindness had not permitted me to see that that was just what they all were doing, but with the old familiar ruses. The bridge players! They knew the gambler's chances. The Fatu Livas! why! and here I almost cracked my sides at the thought of the loaded eggs, supposed to roll, but like the eggs of yellow hue, they too are loaded, the greedy get the shell and the world rolls on!

No, I will not destroy them, I will not take them to the market place. They came from the sea, they are a part of Nature. What can they tell *me, myself?* Not, How can I be made great in the eyes of my fellow fishermen? but rather how can I be made content, within myself, and go on fishing, not as a showman, but just to fish. For fishing is fun!

Quackery de Luxe: A Form of Medical Charlatanism Known as Orificial or Constructive Surgery*

By JOHN F. W. MEAGHER, M.D., F.A.C.P.,
Brooklyn,
Neurologist, St. Mary's Hospital; Consulting Neurologist, Kings Park State Hospital, Rockaway Beach Hospital.

Because nervous and mental patients are particularly likely to be victims of this form of quackery, I decided to make a study of it.

I had my attention first drawn to this cult a few years ago when caring for certain patients suffering from insanity, who had been "treated" by certain socalled orificial surgeons. I made some investigations and gathered much of their literature—if one can call their writings by so dignified a name. The result of my observations I will place before you. It is true that a large part of our profession do not know about these quacks, who are especially dangerous to the health of women patients. While many of them have medical degrees, few, if any, are members of reputable medical societies. They carry on their work and propaganda through church clubs and women's societies. They have grown in numbers recently, and even conduct what they call sanitaria. In Chicago they also publish a medical journal. Much of their literature is written in a style full of superlatives and bombast—there being just enough medical terms—wrongly used—and a hypocritical pseudoreligiosity to deceive certain unfortunate invalids and their relatives.

One of their first victims whom I saw was a girl, a case of dementia præcox, who had been for years in the Kings Park State Hospital and was so badly deteriorated that she looked and acted more like an animal than a human. One of these socalled doctors wanted $150 to operate on the girl's clitoris. The next case I saw was a nurse complaining only of a headache who refused to permit any operation on her clitoris, but who submitted to rectal dilatation —"to get the poison out of the system." She committed suicide shortly afterwards. The next case I saw was a nineteen year old girl, feebleminded and epileptic, who had already been in Johns Hopkins Hospital. She was stretched on a table—for what reason it would be hard to say; had autohemic treatment, some of her own blood serum being reinjected into her, and was mutilated by having her clitoris and nymphæ amputated. Her credulous father told me she had been "circumcised." Immediately following this operation, she went violently insane. And yet the "operator" had the audacity and indecency, weeks later, while she was under my care, to leave a pseudoreligious card for her, writing to the little girl, now insane . . . "whose inner self is noble, sweet, and large . . . freed from the earthtime temple . . . no longer bound by the material fetters." These hypocritical words are meaningless, but have an emotional value to temperamental people. Another one of their victims committed suicide by jumping out of a window. We never hear of those wrecks who just go back home. One cannot imagine the emotional hold some of these quacks have on the families of the patients. The father of one girl asked me if I would hold a consultation with one of them about his daughter, but of course I declined, telling him we did not consult with frauds.

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*Read before the Italian Medical Society of Brooklyn, October 3, 1922.

They especially pretend to treat chronic cases—which type are the usual dupes of quacks. Even educated people fall into their net. A relative of a certain college president, doctors' relatives and others have been victimized by them. One minister's wife had her clitoris removed and was an invalid after having this done.

Now what is this orificial or (as they euphemistically, even though falsely call it) constructive "surgery"? The idea was concocted and developed over thirty years ago. "Constructive surgery is a recent naming of orificial surgery, because it is always constructive, never (!) destructive. It is not always surgical." Mutilating a girl to them is not destructive. Their victims suffer not only financially, but worse still, in body and mind. Very constructive indeed. "They are called orificial because they free the sympathetic as well as the nerves of sensation from trouble." The dictionary defines orifice as an opening or aperture. But why should quacks be dominated by dictionaries?

Originally they admitted only "doctors." But (vol. 8, No. 4, p. 50) later "we admitted to our association members of drugless schools" (i. e., osteopaths and chiropractors). Their "greatest doctor" had his medical license rescinded for this nefarious work. Naturally they could not see that this was proper, and said that a "scathing denunciation should be made for this."

They ask "What about the body below the belt?" . . . "There is a crying need of pelvic operators." From their literature, one guesses that for these burlesque doctors, there is no other part of the body. They say, "The lower orifices of the body therefore (are) the gateway to life." Their audacity transcends that of all other quacks.

And again as to the nature of their work, we find this in their official journal (Vol. 7, p. 222): "So much was said about rectal work, that the idea prevailed that orificial work meant surgery of the rectum alone, when, in fact, as we all know, it included surgery of all the lower orifices." A frank admission that the nose and mouth as orifices are unimportant. Further on, we read, "It has been noted that irritation of the lower terminals of the sympathetic (about which genuine scientists know little, and these ignorant charlatans, nothing) affect the emotional, moral, and religious side of man more than do those of the upper terminals or orifices." Evidently orifice—i. e., an opening—means the same as terminal to these barbarians of English.

They say that millions need circumcision and operations on the rectum, to be saved from ruin. Thus as a wish fulfillment, their victims loom large on the horizon! Another writes that this cult is one of the largest reform movements in progress today. A real reform, of course, would be to put all the members of this cult in jail.

Following out the true quack way of doing things, they pick out a field of medicine but little explored, and make very "wise" deductions. Their writings show they are pathetically ignorant of the sympathetic nervous system, yet they talk, or rather just use words, about it glibly. The poor victims, unfortunately, cannot detect the spurious nonsense in all their sayings.

Here are a few samples of their ridiculous jargon: "Free the sympathetic nerves from the impingements and handicaps of all kinds." Again, "The orificial method relieves and avoids the impingement of sympathetic nerve terminals."

Another writes, "By the history of the case, we find different ailments which come from branches of the sympathetic, and they are one by one corrected." It would be a much less impossible thing to do to tag every hair in the head, than to follow out this procedure. And, "All points of nerve impingement should be recognized and removed." Impinge on what, and remove from what? Of course, this is sheer nonsense, but one must not be too analytical in going over quack claims. Their purpose is to cajole the public, and they know that some of the public want to be fooled, as both Abraham Lincoln and P. T. Barnum stated.

On the cover of their "Journal" is printed in large letters, "We live or die as the sympathetic nerve waxes or wanes," and also, "Study the waste and repair of the sympathetic nerve." On top of this important dictum, one of their number writes (vol. 8, no. 4), "There is no one who can tell what the sympathetic nerve is going to do in the next ten minutes or what it has done in the last five minutes." Which one of the thousands of branches of that system is referred to is not told. But, of course, these rascals care little about being particular or accurate. This next writer, however, sticks closer to their battlecry, "As I listened to this profound paper, I could almost see the human form divested of all material except the sympathetic nerve." (Vol. 7, p. 235.) This enthusiastic statement was written before the days of prohibition.

What any medical man can make out of this title of a paper in their journal is hard to say: "Spinal Foramina as Waster of Sympathetic Nerve Energy."

In another place in speaking of the sympathetic, one is directed to inspect and care for every branch. About as easy an injunction to follow as it would be to inspect and study every pebble on the beaches along the Atlantic Coast.

Another writes that he is so pleased with the course that, "there is not enough paper in the world for me to write on to tell you . . . that the one great system is the sympathetic . . . It's the goods." One can imagine the quality of research work this cultured gentleman employs in dealing with the sympathetic and vagus nervous systems.

One need hardly say much as to the chief motives which inspire these quacks. I know of one who gets $150 to $300 for a needless operation on the female external genitals—a socalled circumcision. That money is their chief objective, one can see from reading their circulars. They are told to understand the patient "physically, temperamentally, and financially." "The course has made me a better physician from every angle—even to the pocket." Another writes about "an increased income with less irksome toil." An advertisement recommends to buy a "tension" table (on which to stretch patients) and thus to double your income and lessen your labor.

Like all quacks they are wonderful at propaganda.

They circulate a booklet "in lots of hundreds of thousands, and await results." They say for the propaganda to be effective, their advertising matter must be distributed by the hundred weight and tons. While in 1919 they only had a hundred "alumni," yet they speak falsely of "thousands of physicians who declare orificial measures to be the sheet anchor in such cases." Physicians who do not use their nefarious methods, they declare to be "no good."

One is not surprised at their statement that "one of the most flourishing osteopathic institutions in the country makes a feature of orificial surgery."

They describe their opportunities as a "wonderful and unlimited field of endeavor." They request prospective "students" to enroll before June 1st, in order to graduate with the September class. They say that the course is so condensed and simplified that "you have the knowledge in your head and not in your library." "So master each lesson . . . and immediately apply the knowledge." "Many of our students have become very proficient orificialists merely through their mastery of the correspondence course, and have not even attended an orificial clinic." "We have no dissatisfied students. Join us. Sign the blank." "You pay $125 for the course; only $100, if cash is paid at once." This payment is the only important requirement to take the course.

One old socalled doctor of seventy tells them to send some application blanks; "I believe I can get some of the boys to start studying the course." Rather old to begin such villainy; but the lure of gold knows no age.

The medical sciences of gynecology, urology, proctology, neurology, etc.—any one of which takes years to thoroughly master—are all learned in twenty correspondence lessons by these knights of fraud—and they assert they are even more proficient than are regular doctors in these specialties.

Their language at times is not only ambiguous but is often unintelligible. They undoubtedly think, however, that it sounds very convincing to the public; e. g., "Life force originates from cell intelligence." Again, "We assist our students in analyzing and classifying defects and their reflexes."

One is rather startled by this piece of wisdom that indefinite conditions remain mysterious till "traced and located in some obscure pathology of the rectum . . . the most profound and disastrous conditions are of metastatic character, which leaves the origin devoid of active evidence."

Listen to this captivating piece of nonsense—"The story from pelvic irritation to the premature grave is by way of defective children, immorality in schools, physical invalidism . . . acute and chronic diseases, white slave trade, insanity, and criminality. . . . Pelvic workers will at such time come into their own. . . . Speed the day."

They advertise that orificial surgery improves the circulation thus—"The blood stream will carry life and joy with benefits to the spiritual, mental, and emotional natures, noble aspirations and constructive courage." This jargon sounds as though it was borrowed from another well recognized form of quackery founded by a paranoiac lady. Only this cult makes all illness and even lack of financial and social success as being due to need of rectal dilatation and circumcision.

These frauds prey on the fears of certain mothers. For they say circumcision of the girl or woman of any age is as necessary as for the boy or man. (Women, particularly, are their victims.) "If not performed when required a girl's life cannot be normal." Here they make a strong appeal for more victims and pari passu for more money.

One of them writes, "First and foremost, examine all rectal and anal canals, because we must get the experience." This appears to be the only sort of experience they seem to care for. Another says, "I have been astonished at the multitude of sins concealed within the rectum." Sin is a transgression of a rule of rectitude; according to their philosophy, the home of rectitude must be in the rectum.

I am sure that we will all agree that the most dastardly of all quacks are those who deceive the relatives of the victims by a hypercritical pseudoreligiosity, which is nothing short of being sacrilegious. This is one of their strong points to further their own nefarious ends.

So it behooves clergymen to become acquainted with these frauds, as their victims are chiefly good. confiding religious people, whom they reach by means of booklets sent to members of church societies and women's clubs. In the booklet distributed by them we read: "Many a clergyman sends his charges to a physician, only to have them returned in worse condition than when sent there, because the physician being ignorant of these matters—(of which these correspondence quacks are all wise)—tells the youth that he is all right, thus adding hopelessness—at whose door does the sin lie—at the youth's, or at the doctor's?" And further we read, "In the great wave of moral reform—the laity should demand this skillful attention to the lower orifices of the bodies of their children." And one of their lady members writes that "rectal and genital treatment in children is more important than attention to their eyes, nose and throat." In another place they write that as a result of their treatment "the body shall be released from every fetter that binds, that the spirit shall be directed Godward." Comparing this to the note written by one of them to one of my patients who went insane after a lady member of this cult mutilated her external genitals, it looks as though they used a certain pseudoreligious formula in talking and writing to their patients.

In another place we read, "See the heartbroken mother as the . . . (orificialist) extends the unmistakable glance of sympathy, courage, etc." And also, "This boy's physical handicaps were surgically removed, and he awakened to a threefold new life." If their method of circumcision of a male in any way resembles the circumcision which they did on one girl whom I subsequently examined, then that male should fold his "tent like the Arabs, and as silently steal away." For he would not even know himself. And again, listen to this, "Truly, as is declared in the Hebrew Scripures, 'The blood thereof is the life thereof,' and it has been shown [?] that the blood under constructive surgery is instantly improved."

One writes (vol. 8, p. 68), "They call orificial surgery bless-ed." (Note the spelling.) Another says, "Sin and sickness are synonymous terms." Another one states that "If vice conditions continue to increase in the next fifteen years in the same proportion they have in the last ten, we shall be a nation of incompetents."

"The child's body . . . find physical conditions that make it impossible for him to have a clean mind. When parents, instructors, and physicians in general come to recognize these physical irritations, they will forgive criminals," etc. A good prepuce and a perfect rectum evidently ought to be proof against crime; at least should confer immunity against a jail sentence.

The orificialist "proves all things and holds fast to that which is good." (A moneyed patient, of course, is bled white.) From a "reprint" we read, "His body . . . cleansed of its physical irritations . . . then shall he, this TRIUNE EARTH MAN be lifted up to an at-onement with the Triune God." Truly, wolves in sheep's clothing. They say that by removing irritation from the pelvic organs "many liars can be made truthful, thieves honest," etc.

It was a tedious matter to go through their "literature" to get some of their ideas on physiology, pathology, and diagnosis. Without a word of exaggeration one sees nothing whatever but references to the rectum and external genitals. Other organs in the body from their viewpoint, are apparently there through courtesy, and of no particular importance. And they only are good observers. For we read, "Physicians—i. e., regular doctors—often do not know what a normal anus and rectum should look like."

They use a table for stretching patients—"while the body is under tension, which compels all the muscles of the body to relax." Though foolish, this is certainly a novel idea ,and keeps all the poor victims returning regularly to be stretched. One of the leaders of this cult in an article on pelvic hygiene says that "pelvic conditions not only dominate the form of respiration and the heart tone, and hence the oxygen supply (and) tissue metabolism." Also that the rectal and vaginal sphincters by "their close nervous association with the middle coats of all the tubes of the body, seriously handicap abdominal respiration."

The following will be news to most doctors. This writer says that in nine out of ten chronic cases, if the patient is asked to take a deep breath, the doctor will feel no motion in the abdomen; this "shows conclusively an impeding of the sympathetic branch which supplies the diaphragm—the cause of which is very often found in rectal irritation." Certainly these quacks are irresistibly drawn to this region—no matter what the excuse.

Another writer states, "The normal exhilaration felt after a normal stool is due to the message of *bien être,* sent by way of the rectal respiratory reflex arc to every tissue in the body." Another one writes that after a rectal operation "the patient left his crutches; could run . . . and now uses his fine baritone voice." Here is a clue for one aspiring to a grand opera career.

"Faulty metabolism is caused by impingement of the sympathetic nerves at the rectum." (Vol. 8, p. 78.) It would be futile to go on quoting from these quacks just to refute their absurd principles. The nonsense of their sayings is sufficient for this purpose. I merely quote further to show the arrogant audacity of these comedians posing as doctors. One writer says, concerning operations on the rectum (p. 238), "Specula or packing must be removed so that the patient can breathe." Another writer says that the "trivalve speculum (in the rectum) stimulates peristalsis, and enlivens both nervous systems and flushes the capillaries of the body inside and out"; wherever that may be. Possibly they have fashions in speculæ—for winter or summer breathing.

Here are a few other quotations: "Peristalsis performs all the chores of the body, except chemism." (Vol. 7, p. 224.) "Give the sympathetic nervous system a chance." It would be better to give the patient a chance—to escape. "I will not talk of chemism, though fascinating it may be." (Vol. 7, p. 231.) "Crowded teeth, preputial adhesions or rectal pathology will inhibit or accelerate peristaltic rhythm. Spinal impingement will do the same." (Vol. 7, p. 234.) They omitted to say that sitting on the North Pole would also do the same. Another gem is this: "In the study of the rectal reflexes, the fact that the sympathetic nerves do not decussate simplifies the matter of tracing through the trophic and also the cerebrospinal nerves."

No one—not even the writer—could understand this. "The personal observations of the writer indicate that rectal disturbances act most frequently through the commisural fibres to the ganglia and plexi of the trunk, and so are more frequently responsible for profound nutritional changes; whereas the reflexes from the sexual organs are more frequently referred to the cerebrospinal fields. This . . . may not be true, for one man's experience is not sufficient to establish a conclusion." One wonders why the writer, after getting off this awful stuff, becomes so modest at the end—surely not because of shame. Possibly because of fear of drowning in his own pathological brilliancy.

But to go back to the reflexes—the real facts about which are evidently a closed book to these quacks. This writer says that the course "has taught me where to look for the probable origin of pernicious reflexes . . . to remove them . . . and to crowd them out with the therapeutically elicited reflexes."

Another writes, "The lower portion of the rectum, the home of the reflexes." This is the first time we ever knew the reflexes were domiciled in a regular home. And the other reflexes of the body—those of the skin, eye, pharynx, etc., certainly would need a guide to return to a home they never knew of before. By now, no doubt, you are quite convinced that these jolly "doctors" are little concerned about such valueless organs as the heart, lungs, etc. The writer of the paper called The Rectum as a Therapeutic Field says that the nerves of the rectum are connected with the other nerves of the body, "Hence the therapeutic field of the rectum comprises the entire body." One can imagine how this "professor" would remove a foreign body from the eye.

A writer who puts A. M., M. D., F. S. Sc. Lond. after his name, asserts that in nearly all diseases "there will invariably be found more or less irritation of the rectum, or the orifices of the sexual system, or both. This proposition was given by Dr. ——— (a leader of these quacks), with a liberal reward offered to anyone who could refute it. A generation has passed with no one claiming the reward."

They are wonderful diagnosticians, as the following will show. "Irritable children, kicking off the covers (means) very likely clitoris or prepuce trouble. Pain . . . down the sciatic nerve . . . very likely trouble in the rectum. . . . I am enthusiastic." One is glad that he didn't say intoxicated or psychotic.

What do you think of the mental state of the charlatan who writes this scientific *bon mot?* "If the irritation to the clitoris is from an abnormal hood, the nerves are excited to the extent that the sympathetic nerve waste is sufficient to interfere with the circulation, say to the intestines, by way of the pudic to sympathetic pelvic plexus . . . because the function of red bone marrow and spleen and liver are not able to do their work, and you have a functional sick body . . . find the cause, clitoris." Another writes, "There is frequently a varicose condition of the vagina, uterus, and perhaps also of the lower rectal inch." From their writings one would get the idea that they measured this important organ, the rectum, in feet, yards or miles, rather than in inches.

In reviewing their methods of treatment, you will notice that not only all diseases, but even family squabbles, untruthfulness, etc., are treated via the rectogenital route. Apparently they know of no other method of procedure. To give a brief idea of the scope of their work, I quote from their booklet:

"Anemia, angina pectoris, asthma, chorea, chlorosis, constipation, dementia præcox, chronic diarrhea, enuresis, epilepsy, goitre, hay fever, insanity (any and every kind, of course), lumbago, marasmus, necrosis, neurosis, neuralgia, neuritis, neurasthenia, paralysis, tic douloureux, torticollis, tuberculosis of bones and other tissues, latent syphilis, varicose and other ulcers, and many other deep seated, stubborn conditions are intelligently managed in the light of orificial surgery." And further on we read:

"Temperamental and emotional diseases, dyscrasias, temperaments, tempers, perversions, lowered vitality, impotence, sexual incompatibility, nymphomania, inordinate erotism, kleptomania and other criminal tendencies, delinquency and all affections of emotional origin can be approached, analyzed and treated, and cures effected by the thorough orificialist." And to think of it, all this accomplished by dilating the rectum, and nipping the prepuce in the bud. Why did they omit tightrope walking? But even the above does not exhaust their capabilities, for we read further that "Cases amenable to the application of constructive (?) principles are found all the way from the unmanageable little girl to the insane woman; from the foolish, hysterical adolescent girl to the loadstone wife; from the slightest anemias to the pronounced tissue changes; from the tiniest discrepancies in character to grossest immoralities; from the slightest home inharmonies to the divorce court; from all forms of human suffering and disease to health and happiness."

Here is a case report by one of their artists. "With fear and trembling I began dissection of the pus sack (spelling his), and when I got through, I had a whole in the buttock as large as a baseball. I kept the patient in bed, and wrote the school for suggestions." We trust that the school was not away on a holiday. Remember that these extracts are all taken from a socalled medical journal, and not from any "funny sheet." And some members of this cult "treat" hundreds of educated persons, who must be extremely gullible.

In another case report the writer said that the rectum was spastic from "pockets and papillæ," sort of a burlesque pathology. "After fifteen minutes' work, the finger finally passed" into the rectum, and cyanosis and headache disappeared. Too bad that the poor victim did not also disappear toward home and safety.

Another of their astute clinicians reported that a boy after being circumcised—probably instead of getting a new winter suit—became strong and well, and now "could play in the snow." Before, one infers that he could only play in the rain. Just what the prepuce had to do with playing in the snow is a mysterious question. One of them cured a case of constipation by dilating the os uteri; another cured a case of diarrhea by treating the clitoris. (Vol. 7, p. 230.)

These quacks are always optimistic, and at times almost delirious about their method of treatment. For example, one writes, "I never knew where cures came from until I became a student of your course." Another says, "I have been thinking orificially (i. e., of openings) ever since." Still another says, "Doctor, you are the only one out of ten doctors, who ever looked at the foreskin." If a patient should sneeze in the presence of one of these quacks, he undoubtedly would recommend a circumcision immediately.

Another promptly cured a girl of nervousness, stomach trouble and bed wetting by circumcision "combined with dilatation of the urethra and rectum." Another said that he "dilated the internal sphincter, and yet had no reason for doing it, since he could not see anything that looked or felt abnormal." Just to pass the time away, one supposes. Then he adds that he removed a few varicose veins and the patient was able to have an orgasm for the first time in seven years.

It might be interesting here to quote one of the oldest members of this cult in Brooklyn, who with his wife does a very flourishing business. One of them is a homeopath, the other an eclectic; their son is an osteopath. This person took to this form of quackery years ago, when, as he says, "a flood of light burst in upon me." Continuing, he states (vol. 8, p. 68-69), "My first orificial case, a member of my own family (had), baffled the skill of physicians, and for whom I had prescribed silicea, because of the characteristic symptoms of that drug, namely when about to pass a stool, it would slip back. Furthermore, when passed, severe darting pain resembling angina pectoris would pass through the heart."

"Upon reaching home I examined the patient, and discovered three large rectal papillæ. Under local anesthesia I confidently steered my pointed scissors toward their base. To my patient's as well as to may own satisfaction I found that I was at last dealing with a basic principle of cure. The so diagnosed angina pectoris never returned."

"The next year my silicea angina pectoris patient, Dr. ——— (his wife) attended the clinic for orificial surgery with me. She at once became a dynamo of enthusiasm, and proceeded to load our grips with instruments. She could not wait until we reached home to try her hand at orificial surgery. Accordingly, we stopped at ——— Sanitarium in Binghamton, where she cornered me and gave me to understand that I needed the work done; and that I should yield to her wishes." He does not specify whether she operated on his rectum or genitals, nor whether radically or conservatively. "Here were three orificial enthusiasts against me. What could I do?" She said she operated on him wisely "in answer to a great truth from a great truth giver." "With her characteristic expression of something accomplished, she assured me that it had been well done." We trust she did not completely ruin him. But certain it is that more than one woman has been ruined by this lady since. Will one not agree that it is a shame that poor innocent victims are allowed to fall into such hands. It is the son of this pair who announces that he cures deafness and blindness by finger surgery at $15 to $25 a visit to his office. And he does not want for patients.

As I said before, nervous and mental patients particularly, are likely to fall into their hands. In a case where all other doctors had failed, one of them cured a facial neuralgia of eight months' duration, by rectal treatment. Another cured an apoplectic stroke by the same means. Another managed a case of chorea by treatment of the clitoris "combined with deep spinal work over the lower lumbar vertebra." Another explained a case of chorea of five years' duration this way: "Careful examination from an orificial and osteopathic standpoint showed the cause of the chorea was dislocated vertebræ in the cervical and upper dorsal regions, and need of circumcision." He "corrected" these and a cure resulted.

Nearly the whole of the tenth issue of volume 7, of their official "journal" *Constructive Surgery and Medicine,* is taken up with a consideration of dementia præcox. One can imagine how these quacks would handle such a difficult psychological problem. One of them asks, "Can dementia præcox be cured? This question means much if it can be answered in the affirmative, and it is cruel to talk of it, if it must be answered in the negative." Inasmuch as these "doctors" never have any failures, but cure everything by way of the rectum and prepuce, one can readily guess how he answered.

In the discussion on dementia præcox, one of these astute clinicians said, "that you could put a man in bed with one of them, and they would turn their backs on him," thus multiplying the patients while you wait. Another one, discussing this same subject, said that he put a band about a patient's arm, and that the veins dilated greatly: "The idea that veins could dilate that way under excitement, two or three or four times their normal size had never occurred to me. I said, 'This accounts for the thousands of cases of dementia præcox, where he drops from normal to abnormal. He dies and you can't see anything.' " And further we read "that the blood cannot get back to the heart, and we have toxemia." "Toxemia," "autointoxication," and "poison in the system" are favorite catch phrases of theirs.

A defective delinquent girl who had been sick for years, was cured "since her orificial and osteopathic operation had struck the hour of her emancipation." Using meaningless flowery language is a favorite trick of theirs.

One of their number who was handy with the knife reports this "interesting" case. The patient was a demented woman of fifty-six, who became perfectly well and rational the day after the operation, which evidently was sort of a field day affair. This is what she had done to her: "Cæcal readjustment; a subperitoneal fibroid removed; a ventral fixation; circumcised; remnants of hymen and urethral caruncle removed; urethra dilated; the uterus dilated and packed; pockets and papillæ and a hemorrhoid were removed after complete divulsion of the anal sphincters; and to give a new floor to the pelvis, a perineorrhaphy completed the work. . . . This was all done at one sitting, during a rain and hail storm." This last mentioned fact makes the treatment more romantic; and these quacks just flourish by means of romance. We need not comment on the management of this particular patient.

One is not surprised to see that, conforming with the attitude of the ordinary quack, the writings of the members of this cult are full of silly criticisms of legitimate medicine and regular physicians. In fact, in this respect their impertinence knows no bounds. Unwarranted, derisive remarks have always been, and always will be, the weapon of the ignorant weakling, and the fraud.

They say that if regular doctors would only take this brief correspondence course—and no sane physician would so insult his intelligence—that then "the medical world would be . . . much more intelligent, and the poor, defenseless public healthier and happier." Again we read that "orificial thought is so foreign to the medical conception of disease causation, that one will stumble all around it before seeing and appreciating its value." One can conceive that stumbling is one of their chief traits.

They claim to cure conditions "not possible of cure with the general therapeutic measures of the day." They say that the orificial surgeon "is not hidebound, nor is he tied to any hierarchy." No, of course not. We all know that quacks recognize no authority but their own mind, and their mental state is characterized, not by modesty or a desire for the truth, but by impudence and a desire to deceive. Their statement that many thousands of the best American physicians are orificial surgeons is an utter falsehood. Still, why should a quack be limited by the truth.

They also say that "It is surprising that practically none of the famous specialists in the treatment of various organs of the body, including the nervous system, ever examine for orificial lesions. The neglect . . . is appalling . . . they do not see the origin of sympathetic nerve waste." Comment is unnecessary. In their booklet they say, "Orificial application will not interest the lazy doctor." And we might add, "No, nor any real doctor."

Very few doctors, they say, understand the nervous system, but they, of course, are fully conversant with everything about the nervous system, from knowledge which they have acquired from a silly correspondence course devoted to reflections about the rectum and the prepuce! Apparently, they modify the James-Lange theory of the peripheral origin of the emotions and locate the mind in the rectum. For them a single glance at this region is sufficient to diagnose sanity or insanity.

The following from their booklet is characteristically offensive. "Hand this (booklet) to your family physician. If he has taken the postgraduate course, he will wisely advise you." "If he knows nothing (in very large print) of these methods, he is not capable of advising you." All of which means—"Come to us, we only can cure you." And remember that this rectogenital treatment is not only to cure all disease, but to prevent divorce, empty jails, improve one's social status, etc.

If one could for a moment forget the tragedies of this humbuggery, he could not help but laugh at their arrogant nonsense. But these quacks are a real menace to any community. They give some queer titles to the "scientific" articles published in their journal. Here is one, for example, "Live Wires in Male and Female." (Vol. 8, p. 73.)

The following amusing announcement is taken from their "journal." "Orificial cuts for office use." "At the suggestion of . . . the school has made sets of cuts showing different views of normal and abnormal rectum, penis, foreskin, frænum, clitoris, glans, hood, labia minora and vestibule. They are proving to be a valuable aid in case taking. The set will be sent for one dollar." These "cuts," of course, would be very appropriate for a doctor's office. The Metropolitan Museum of Art would possibly be delighted to acquire a set also. For it certainly sounds like a fascinating collection. They advertise that "if generally used, orificial methods would empty our jails, prisons, almshouses, and asylums."

One of the doctors wrote the school that he was most enthusiastic about the course, saying, "If the course gets any better, farther on, I don't know whether I will be able to stand it or not." For the sake of the public weal, let us trust that he could not, and that he has taken up some other business where brawn rather than brains is the *sine qua non*.

The following is evidently written by one of their particularly clever artists: "It was a functional paralysis from orificial impingement (in ordinary English this has no meaning) with complete loss of control of the legs and partial loss of control of the arms. In circumcision, after dividing the dorsal prepuce, the incision was carried to the right. To our surprise the right leg promptly drew up. Then the cut was carried to the left side, and the left leg came up." One is amazed at this wonderful experiment. One trusts the organ was not entirely ruined by this little travelogue. Can anyone but be surprised that these quacks are allowed to live outside of a jail. For there the only thing that they would be allowed to operate on would be a plate of oatmeal.

One of the "doctors" evidently did not fully appreciate one of the correspondence lessons. So he wrote to the school, "I have never seen the ideal prepuce as described in lesson eleven." He then reports the case of a bridegroom who ruptured his short frenum, and as a result of this he became a new man and gained in weight. The doctor called this "an accidental orificial operation." One wonders if the bride *ipso facto* became an honorary member of this cult. Can you imagine a man who has the privilege and honor of putting M. D. after his name publishing this sort of stuff. This "doctor" who never saw the ideal prepuce might have been a success as a song writer. Then we might be singing "Where is my wandering prepuce tonight?" One could hardly imagine, however, with these eagle eyed scouts prowling about that any prepuce would have the temerity to wander far away from home. When it comes to prepuces this cult believes in a massacre.

I was rather surprised in reading one number of their "journal" to find that they had a nose and throat specialist. But I soon discovered that this one practised like the rest of them. I quote from their "journal" (Vol. 8, p. 75): "His special work for some time has been troubles of the upper orifices and cavities, but unlike the usual nose and throat specialist, a large part of his treatment for these troubles is pelvic attention . . . the true spirit of the orificialist." This nose and throat specialist now tells you how to examine the female external genitalia. "Examine the tissue texture as in the male, with the same conclusions in the same existing conditions. If the tissues are full in both labia majora and labia minora, we will have a full blooded person who accomplishes things, provided the tissues in the rectum are in good condition. . . . If the labia majora are flabby or flat, then the round ligaments are relaxed, and we may look for trouble in all the rest of the ligaments." This "professor" should try his hand at writing up the causes of the World War, rectally considered; he ought to be qualified from the submarine standpoint. As a nose and throat specialist, he is certainly exploring territory far from home.

Quoting as I have from their "literature," it has been impossible to avoid a certain monotony in this review. Their ridiculous claims are hardly worthy of any serious study. Yet you would be surprised at the number of educated people who consult them. For none knows better than those scamps that a certain proportion of the public, having no technical knowledge of the causes or the manifestations of illness, are sure to fall into their nets.

The fact that many of these quacks have M. D. after their names makes them doubly dangerous. Others are osteopaths and chiropractors. Like the members of all irregular cults, they are only interested in patients who can pay. The patronage of the poor they do not solicit.

One can hardly believe that any man would subscribe to this fraud. And if ignorance cannot be claimed, then we must say that the members of this cult are arrant frauds. That many of them have certain paranoid trends, and are also actively sadistic, I believe to be true. By assuming the manners and attitude of respectable people, they seem able to deceive the public and the press.

No honest man can ever be a successful quack. The real quack is totally lacking in altruistic feelings and decent traits, yet on occasion can couch his villainy in honeyed language. Some of them even know how to attract champions to their cause. This particular form of quackery is about as low a one as I know of. By means of subterfuge they get the names of prominent people, and use these names to further their ends. They should not be allowed to victimize the poor gullible invalids as they do. But how are you going to stop them? Never by appealing to their decency, for they have none.

Louis Pasteur

By LOUIS GERSHENFELD, Ph.M., B.Sc., P.D.,
Philadelphia,
Professor of Bacteriology and Hygiene, Philadelphia College of Pharmacy and Science.

Louis Pasteur was the most striking figure in nineteenth century science. He revolutionized chemistry, physics, biology, medicine and surgery, and opened up new fields in bacteriology and sanitation. His work on practical subjects, on fermentation and spontaneous generation, not only represent great advances in science but opened new avenues into scientific knowledge.

Louis Pasteur was born on December 27, 1822, at Dole, France, the only son in a family of four children. When young, his family moved to Arbois, where he attended the Arbois primary school and later the College of Arbois. He was merely an average student, showing a marked taste for drawing. In the fall of 1838 Pasteur went to Paris to attend a boarding school but was soon compelled to return home because, as he expressed it, of the loneliness in Paris. He again entered the College of Arbois and during 1839 carried off many prizes. Because the classes here were not far advanced, the following year he went to the Royal College at Besancon. Here he taught physics and mathematics, receiving board, lodging and a small retaining fee. He successfully passed his examination in the studies he pursued at the Royal College and in 1842 took an examination to gain admittance into the Ecole Normale. Dissatisfied with the low average he received in his entrance examination, he resigned and decided to compete again the following year. During the interim, he gave private lessons in mathematics and attended lectures on chemistry by J. B. Dumas, the great chemist. At the end of the year he took his admittance examinations again and was fourth in the list for the Ecole Normale. Here he proved to be a satisfactory pupil but did not distinguish himself by any exceptional merit. From 1844 to 1847 he was devoted to the study of chemistry. During the first five months of the year 1848, four different papers were presented by Pasteur to the Academy of Science on the subject of crystallography. In the same year he was made professor of physics at Dijon. In the month of January, 1849, he was appointed to the chair of chemistry at Strassburg. It was here he met the daughter of the rector of the academy whom he married during the month of May of the same year. For the next few years, until 1853, he followed up researches in crystallography and during May of the latter year he succeeded in transforming tartaric acid into paratartaric acid.

He proved there existed various forms of tartaric acid—all identical from the point of view of their physical and chemical properties, save that they each had their special hemihedral facets and the corresponding rotary power. The first effect was that of gaining for Pasteur the Cross of Chevalier of the Legion of Honor and a prize of 1,500 francs awarded by the Pharmaceutical Society of Paris. His growing reputation led to his nomination in the fall of 1854 as professor and dean of the newly created Faculty of Science at Lille.

His next great study was an attempt to explain to his satisfaction a correct reason for fermentation. It was in his writings on lactic acid fermentation, published in 1858, that Pasteur presented the idea that a specific ferment was associated with each fermentation. He further mentioned that if two organisms simultaneously invaded the same medium, the one which was best adapted to the existing conditions continued to flourish and produce the characteristic end products.

It was during the beginning of these studies on fermentation that he accepted the nomination of administrator of the school and subdirector of science studies at the Ecole Normale in Paris. It was here he arranged for a small laboratory at his own expense and where he followed up his investigations on alcoholic fermentation.

In 1860 he published his thesis on alcoholic fermentation, in which he pointed out clearly that glycerine and succinic acid were formed in considerable quantities and almost as constantly as the principal products of the fermentation. After thorough work on alcoholic fermentation which proved the truth of his theoretical assumptions, he returned to lactic fermentation and started other experiments along these lines. A distinct surprise was, however, in store when he experimented and was able to produce a butyric fermentation. Bodies similar to the nonmotile alcoholic and lactic ferments (which were considered as vegetables) were not present. The butyric ferment he first called vibrios and because of their motile nature regarded them as of animal origin. Little did he suspect that this discovery would soon open a new world, the kingdom of the bacteria. Another important fact that he observed was that the butyric vibrio lives in the absence of oxygen and in fact fears its contact, thus the introduction of the idea of anaerobic life.

In all his works and writings on fermentation he presents the problem in such a clear way as to prove definitely that fermentation is a specific phenomena, due to the existence and development of a particular organism specific for each different type of fermentation. After demonstrating that ferments cause fermentation, Pasteur proceeded to prove definitely to the partisans of spontaneous generation the germ theory. He definitely and convincingly showed the existence of living organisms in the air. He even determined the temperature necessary for their destruction and pointed out the necessity of flaming all receptacles used in microbiology—a technic still in vogue today.

It was during his experiments on microorganisms in the air that he mentioned in his communications to the Academy of Science the use of cotton as a filtering agent to remove bacteria, the advisability of heating milk to 110° C. or 112° C., or one and a half atmospheres, to kill all the germs, and if their reinvasion is prevented no alteration will occur; thus the introduction of steam under pressure, or the autoclave. He made mention of the existence of germs that produce spores as the Bacillus subtilis, and showed that boiling at 100° C. was not sufficient to destroy this organism but that it must be submitted for a half hour in an autoclave to a temperature of 120° C. He even stated that blood, urine and body fluids most prone to alteration, if removed with suitable precautions from normal healthy living animals, could be kept without alteration, provided the air in the immediate environment was freed from germs, and finally he clearly demonstrated that the dust in the air contained the germs, and the more dust laden the air the more numerous the germs. It was in the latter communication that he showed the direction of his thoughts when he said: "It is very desirable to carry these researches sufficiently far to prepare the way for a serious inquiry into the origin of disease."

In 1861 the chemistry section of the Academy of Science awarded him a prize. In 1862, after his third attempt, he was nominated member of the Academy in the section of mineralogy.

Pasteur showed clearly that the socalled diseases in wine, etc., that is, bitterness, acid taste, ropiness, were due to the presence of foreign germs and he set about and showed how to correct these faults. The practical consequences of his discoveries equalled their theoretical promise.

He soon interested himself in the changes in alcoholic liquids which led to the formation of vinegar. His experiments and observations, which were announced in two communications to the Academy of Science in 1862 and in an article in the scientific annals of the Ecole Normale in 1864, started one of his greatest discussions and conflicts with Liebig, the eminent German chemist.

Pasteur gave conclusive proof that what was necessary was the Mycoderma aceti. This organism he proved to be singularly prolific, and possessed of a marked aerobic character. It was here with the collaboration of Chassang, professor of Greek, that the word aerobic was coined, and to characterize the opposite function, as in the vibrio butyricus, the word anaerobic. This aceti microorganism takes the oxygen from the air and transmits it to the alcohol for oxidation. In 1867, at the invitation of the mayor and the president of the Chamber of Commerce of Orleans, Pasteur went there and taught his method to the manufacturers in that town. He restored security to the Orleans vinegar manufacturers, who could control and regulate the production, and thereafter succeeded in making rapid progress.

Pasteur now reached one of the turning points of his life. For a long time he seemed to connect the theories of fermentation with those of disease and this relationship became still closer when he convincingly proved that living cells controlled the processes of fermentation. It seemed, as was pointed out in many writings by his associates, that Pasteur hesitated coming in contact with diseased conditions in the higher animals, because he always asserted that he was not a physiologist, though he did attend a course of lectures given by Professor Claude Bernard.

In the early part of 1865, Pasteur was compelled to take up the problem he had hesitated over for so long a period. He had been asked to take up the study of the silkworm disease, and with great hesitation he finally accepted the mission offered to him. He had only the vaguest idea of agriculture. He, however, soon acquired a fragmentary knowledge of the general structure of the larvæ of insects by causing the latter to be dissected in his presence, and obtained as much information as he could from the latest published works on the subject. In June, 1865, Pasteur set out for the silkworm district of France. His researches lasted for six years. Pasteur showed that the failure of the silkworm was due to two diseases, *pébrine* and *flacherie,* which were directly communicated to the eggs of the worm. To prevent the disease it was necessary to procure absolutely healthy eggs and then prevent their contamination by diseased worms. The eggs of worms which showed signs of disease were to be rejected. Pasteur thus discovered the cause and course of the disease and presented the foregoing simple suggestions as a method of preventing its recurrence. By the introduction of these precautions, the silk industry of France was brought back to prosperity.

The six years which he spent in studying the silkworm disease were the hardest days of his life. Fate had dealt him a number of blows which had made his work doubly difficult. He had already lost his mother and his eldest daughter. At the outset of his work in June, 1865, he was summoned to his dying father and arrived only in time to attend the funeral. In the month of September, of the same year, he lost his youngest daughter, Camille, who was barely two years old, and in May, 1866, his daughter, Cecile, died at the age of twelve and a half years. Of the five children who had been an inspiration to him, only two remained.

On July 1, 1867, he was summoned to Paris where he received a prize awarded to him for his studies on wine. During this period there were some disturbances that occurred at the Ecole Normale. The school was reorganized. A complete change of faculty took place and Pasteur was compelled to drop out. He, however, was soon appointed professor of chemistry at the Sorbonne. In April of 1868 he saw to his great joy the beginning of the building of the laboratory of chemical physiology, as he termed it. The strain of work and the worry of all the controversies Pasteur had at this time was too great, and in October of 1868 he was seized with apoplexy. (It seemed that even fate was against him.) He could not speak and his left side was paralyzed. His convalescence was slow but steadily progressive, and it was not until the early part of 1869 that he was able to get about. He never completely recovered from this illness and was always afterwards somewhat lame.

A few days after Pasteur had left Germany in July, 1870, where he stopped to visit Liebig, war was declared. His son, aged eighteen, soon enlisted, and Pasteur with his wife and daughter withdrew to his old home at Arbois. He was so highly incensed at the outrages committed, that in January, 1871, he returned to the dean of the faculty at Bonn the diploma of doctor of medicine which had been awarded him in 1868 by the university of that town in recognition of his work. During this period he refused an offer by some Italians for a directorship of a laboratory in Milan or a chair of chemistry at Pisa. From 1871 to 1876 Pasteur did considerable work in improving French brewing. In 1873 he was elected a member of the Academy of Medicine in the section of free associates.

Ideas about infection were confused, and more or less opposition was encountered against the attempt of connecting Pasteur's ideas respecting fermentation with that of diseased conditions. About this time Pasteur began to read more and more of the works of men in medicine, surgery and allied sciences. He seemed to be especially interested in the studies which Davaine was pursuing upon anthrax. In 1861, Davaine proved definitely to the satisfaction of all that a rod shaped organism, which he called a bacteridium, was the cause and the sole cause of anthrax. In 1877, Pasteur with the collaboration of Jobert made his first experiments on anthrax. It is interesting to point out here as mentioned by Duclau, that, Pasteur being neither a physician nor a veterinary surgeon, the history of any disease as a disease did not interest him. What he studied was not so much the anthrax disease as the anthrax bacteridium. He had at his command the method of obtaining pure cultures and thus he had the big secret in being able to study the physiological properties of organisms, to compare them in their pathological reaction, and to establish definitely the etiology of a disease.

During 1870 to 1880 he devoted much time to the study of anthrax, even traveling through infected districts. In his conclusions he mentioned the many peculiar characteristics of the anthrax bacteridium. He showed that a number of diseases existing under different names in animals were nothing more than one and the same disease—anthrax. He even demonstrated that the carcasses of animals might aid in the distribution of the disease if they are not buried deeply below the surface of the ground. It is also here that Pasteur introduced the first example of what was to be called bacteriotherapy.

Some observers in inoculating animals with putrid anthrax blood found that death was quickly produced with symptoms similar to anthrax, but bacteridia were not found in the blood. Pasteur set out to study this condition. His investigation immediately revealed a number of important facts. He clearly showed that the condition which developed was a different disease. The latter was caused by a common bacillus which he calls the vibrion septique. This is known today as the bacillus of malignant edema. He showed that the period of incubation was shorter and death resulted more quickly. He made haste to study the physiological characteristics of the organisms and immediately pointed out that it was an obligate anaerobe and a marked gas producer.

Mention should be made at this time of his celebrated lecture delivered at the Academy of Medicine on April 30, 1878. In his own name, and that of his collaborators, Jobert and Chamberland, he elaborated his germ theory and its application to medicine and surgery. In the suggestions of Pasteur one can constantly foresee the aseptic method.

Pasteur carried on the researches which dealt with facts pertaining to human pathology. In 1879 he examined pus from boils and showed the presence of a microbe which he was able to cultivate. The latter appeared microscopically as a mass of rounded granules comparable to irregular bunches of grapes; hence the name staphylococcus which it received. He shortly proved this same organism as the cause of osteomyelitis.

At about this time considerable discussion had begun at the Academy of Medicine on puerperal septicemia. Pasteur examined discharges and secretions from such infections, and he found in all instances the presence of a microbe which had the appearance of strings of beads (the organism known today as the streptococcus). He had no hesitation in declaring this organism to be the commonest cause of infection in women after delivery. In one of these discussions Pasteur declared it was the doctor and his assistants who carried the microbe from a sick woman to a healthy one.

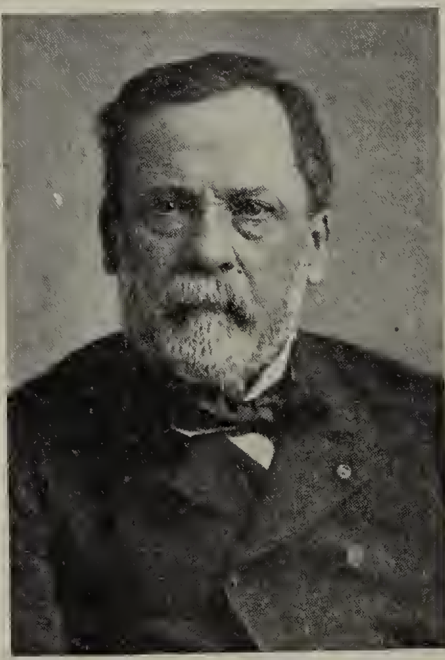
The year of 1880 was a strenuous one. In April he wrote an article on the bacterial nature of plague; in October he read an address at the Academy of Medicine on vaccinia and variola; and in December he began his work on rabies, but his greatest success during the year was his work on chicken cholera. Pasteur succeeded in finding the germ which was the cause of this disease, first observed in 1869 by Moritz, a veterinary surgeon. This germ was successfully cultivated on artificial culture media and always produced the characteristic disease when inoculated into fowls. The course of his experiments were interrupted by a period of vacation. On his return he was annoyed when it was found that these cultures failed to produce the typical symptoms of the disease, when injected into the fowl. To his surprise, the inoculations instead of proving fatal produced but slight symptoms, and the fowls shortly thereafter recovered. After some trouble Pasteur procured fresh cultures of the chicken cholera organisms. Fresh fowls when injected with the latter soon died, exhibiting all the characteristic symptoms of chicken cholera. But when these fresh cultures were injected into fowls which had previously been inoculated with the long standing cultures, no characteristic symptoms were produced. It seemed that those fowls that suffered from the mild form of the disease produced by the old culture were protected from further attacks of the disease.

One of the great mysteries of medicine had thus been revealed. The attenuation of a virulent microorganism, that is, the loss of its disease inciting power, had been attained by the increased age of the culture. He immediately began to apply practically his new theory by providing old cultures for the inoculation of fowls in districts where chicken cholera produced serious ravages.

Mention was made previously that Pasteur was at intervals working on anthrax. With renewed enthusiasm he proceeded to produce a vaccine material for anthrax. His method of attenuating this organism consisted in exposing the cultures of the organism for various lengths of time over a period of successive days at a temperature slightly higher than the maximum temperature at which the organism will grow. After many difficulties and a number of investigations Pasteur succeeded in immunizing sheep and other animals against anthrax. The Society of Agriculture of Melinn had proposed to Pasteur a public trial of this new method. It was in May, 1881, that Pasteur gave this public demonstration, and conclusively established the value of anthrax vaccination. In August of 1881 Pasteur attended the International Medical Congress in London and in December the same year he was elected a member of the Academic Francaise.

From anthrax Pasteur went on to the study of swine erysipelas, rouget, swine fever, or red disease of pigs as it is at times known. One of Pasteur's collaborators, Thuillier, isolated the causative agent, and within a few years Pasteur had established a method of protective treatment. At about this time Pasteur began to receive many medals from different societies and communities who wished to show their gratitude to him. In 1883 the national recompense which was awarded to Pasteur in 1874 was raised from twelve thousand to twenty-five thousand francs. On July 14th, of the same year, he was invited to be present at the placing of a commemorative tablet on the house in which he was born at Dole.

The government offered Pasteur the Grand Cross of the Legion of Honor in lieu of his great discovery of splenic fever and anthrax vaccination. This he condescended to accept only after one condition was met, and that was an award of the red ribbon or cross for his two collaborators—Chamberland and Roux.



LOUIS PASTEUR

While the various researches were being closely watched by Pasteur, one study seemed to be placed above all others. This was his work on hydrophobia or rabies, which he undertook in December, 1880. He soon became convinced that the infection has its seat in the nervous system, and particularly in the medulla oblongata. While working along these lines, he examined the saliva of those who had died of rabies, and succeeded in obtaining an organism from one of these cases in the early part of December, 1880. Following up the study of this new organism he found it in the saliva of people who had died of disease as well as in the saliva of normal healthy individuals. He soon, thereafter, came to the conclusion that this organism, as well as the disease which it produced, had no connection with rabies. It was the same organism which Sternberg in this country reported the same year. A few years later it had received the name of pneumococcus after Frankel who demonstrated its presence in the lungs of persons who had died of pneumonia.

Pasteur therefore was compelled to use the medulla oblongata as he felt assured the causative agent of rabies was confined to this tissue. By means of the latter he successfully produced typical rabies in other animals. Unable to establish definitely the specific causative agent he continued his researches with the idea of attenuating this virus and established a method of prophylaxis. By a series of passages of virus from rabbit to rabbit he finally succeeded in obtaining a uniform virus which possessed a fixed virulence producing rabies after only a one week period of incubation. Further passage from animal to animal did not tend to further reduction of the incubation period. His method of attenuation in this instance consisted of suspending the cords (specifically of fixed virulency therefore known as virus fixe) in a series of flasks at the bottom of which there were placed several pieces of potash. He found that the longer the period of time in which the cord remained suspended the less virulency did the particular cord possess, and finally if exposed for a period of fifteen days all virulency seemed to have disappeared. His method of inoculating humans with these cords, starting with those that possessed slight virulency and increasing not only the dose but also the use of more virulent cords, was soon introduced. Most all countries and many of the governments after careful investigations officially recognized the value of the Pasteur treatment as it became and is still known today, and introduced it in their respective countries. Pasteur institutes sprung up all over the world in many of the leading countries and Pasteur lived to see the crowning of his work on rabies when in November, 1888, the Pasteur Institute in Paris was opened.

In 1884 Pasteur had represented France at the International Medical Congress at Copenhagen, Denmark. The enthusiastic demonstrations which took place in his honor were numerous.

When the Pasteur Institute was finally completed, due to the hearty support of both rich and poor in subscribing to the building fund, he moved his quarters to the institute. He, however, was ill and weary. He attended the hydrophobia clinic almost daily, and superintended the production of the vaccine material. At the same time he was constantly offering suggestions to his assistants, especially Dr. Roux and Dr. Yersin, who were pursuing the study of diphtheria. Later when Dr. Yersin began his wonderful work in Asia working in areas in which bubonic plague was epidemic, Pasteur followed with great interest the communications sent to the annals of the Pasteur Institute. It was Yersin who discovered the causative agent of the bubonic plague.

On December 27, 1892, one of the greatest receptions ever given any living man took place in France. Many men from all walks of life made speeches and presented addresses. It would be impossible to attempt to mention even some of the important ones but a few of the remarks with which Lister greeted Pasteur are of interest: "Truly there does not exist in the whole world an individual to whom medical science owes more than to you." "Your researches on fermentation threw a powerful light which has illuminated the dark places in surgery and has changed the treatment of wounds from an uncertain, empiric and too often disastrous business into a scientific and certainly beneficial art. Thanks to you, surgery has undergone a complete revolution which has deprived it of all its terrors and which has increased its efficacy to an almost unlimited extent."

It was in September, 1895, as Pasteur's career was coming to its close, that he saw about him the entire routine of the making of diphtheria antitoxin, the discovery of which was announced the year before.

On Saturday, September 28, 1895, at 4:40 in the afternoon, Pasteur passed away very peacefully. His ashes repose in a beautiful chapel situated below the main entrance a little lower than the ground floor of the Pasteur Institute. The walls of the chapel are inscribed with the scientific triumphs of the master whose ashes repose there. It is a striking array of headings, representing a great step forward in science. His devoted wife died September 24, 1910.

Pasteur was constantly encountering critics and enemies, who at times made his life unbearable, but with the high quality of thought which constantly guided him he always outflanked these obstacles. Unlike the generality of great men, he, however, enjoyed the meed of almost unstinted appreciation during life. He looked upon the cult of great men as the great principle in national education and he constantly advised students to worship great men. He was always irritated when scientists, involved in arguments over their problems, brought in for consideration the question of nationality. It was at a banquet at the close of the International Congress on Sericulture held at Milan that Pasteur pronounced the words so often repeated: "Science has no country but the scientist has one." In his Lille speech, the sentence "in the fields of observation, chance only favors the mind which is prepared" was particularly applicable to him.

There are many examples of Pasteur's insight, his ability to discover and state a problem, of the patience with which he gathered together information. He lived in advance of his time. He lived with his thoughts without being a dreamer for his dream so regarded at the beginning eventually bore fruit.

It was therefore fitting that scientists the world over united to honor this genius on the centenary of his birth, he whose work had proven of such great and practical utility for mankind and whose knowledge and discoveries are even today beginning their career of developing suggestions and thoughts to scientists.

1831 Chestnut Street.

Pasteur's First Patient

By MALFORD W. THEWLIS, M.D.

Providence, R. I.

The centenary of Pasteur brings to mind events of the scientist's early life—a life of sacrifices and endless toil. The story of his first patient is well known as given by several biographers, yet it might be interesting to hear it exactly as it was told by the patient himself.

Joseph Meister, the first patient of Pasteur, is now janitor of the Pasteur Institute. He is an Alsatian, the son of a baker and pastry cook in the town of Sénesthal. On July 8, 1885, the elder Meister sent his son, then nine years old, to the next town to get some yeast. He left at about five in the morning with a tin pail in hand. At the corner of the street a gigantic dog rushed at him and cruelly bit his hand (he still shows his scar). He fell back on the sidewalk, the dog continued to attack the boy and inflicted not less than fourteen wounds on his legs. As he was crying for help a blacksmith ran toward him and with an iron bar stunned the animal. When the boy was picked up he could hardly stand. Several hours later his mother took him in a coach to the nearest doctor to have the wound dressed.

The autopsy of the dog had been made and hydrophobia recognized. His mother was extremely worried. At this time Pasteur's experiments on hydrophobia were hardly known. It was only the next day that the newspapers told of the experiments which had been attempted by a chemist in Paris (Pasteur) and these had been successful.

The mother was brave, she realized that her only chance for her boy would be to go to Paris and find the scientist mentioned. The next day they went to Paris by train, where they were among strangers, finding themselves confronted with difficulties. In all the hospitals they visited they were invariably told that the address of Pasteur was not known and that his experiments on hydrophobia were not as satisfactory as the newspapers had heralded. The seeds of professional jealousy had already been sown. They went from one hospital to another in vain until they came across someone who happened to know where Pasteur lived and his address was given to them.

However, Pasteur, when found, did not seem willing to treat the child. The boy's mother begged him to treat her son; Pasteur replied to the woman that thus far his experiments had only been performed on animals, and that they might be dangerous to man. She pleaded and Pasteur's great heart overcame his moral scruples, the mother told him that he alone could save the child and if necessary she would make the sacrifice of his life, to her it was to be immediate death or salvation, instead of the ghastly end she dreaded.

Touched by her prayer and confidence, he immediately gave the child his first inoculation and the treatment lasted twenty-one days; at the end of a month the boy returned to his parents completely cured.

Pasteur continued to inquire about Meister's health and the latter wrote to Pasteur every other day for a long time. The scientist treated the boy as if he were his own son, later he gave him the position he still holds as janitor.

The poor man's devotion to his savior's memory, its touching simplicity, is as great a tribute to Pasteur as the elaborate monuments erected by scientific bodies who had misunderstood and ignored him during his years of struggle.

193 Watermann Street.

Editorial Articles

FREUD ON HAMLET.

The recent popular interest in John Barrymore's masterly interpretation of *Hamlet* makes it especially worth while to recall Freud's conception of the same character, upon which Mr. Barrymore undoubtedly based his representation of the Prince of Denmark. In his great work on *The Interpretation of Dreams,* Freud places Shakespeare's *Tragedy of Hamlet* on a level with Sophocles's *Œdipus Tyrannus,* as the greatest creations of tragic poetry based on the theme of the infantile incest wish. The wide difference in the two dramas lies in the difference in the psychic life of the two widely separated periods of civilization —"the agelong progress of repression in the emotional life of humanity is made manifest in the changed treatment of the identical material." In *Hamlet,* the basic wish phantasy of the child, instead of being brought to light and realized as in a dream—that which happens in *Œdipus*—remains repressed, and its existence is revealed, like that of a neurosis, only by the inhibition resulting from it. Up to the present time Goethe's explanation of Hamlet's vacillations and hesitations has been the generally accepted one—that he was the type of person whose energies were paralyzed by an overdeveloped intellect—"sicklied o'er with the pale cast of thought." Others interpreted him as a weak, morbid neurasthenic, on the verge of insanity.

Freud points out, however, that Hamlet is not represented in the play as a man wholly incapable of acting, citing his killing of the eavesdropper Polonius, and the cunning plan of sending the two courtiers to death as illustrations of his point. This leads us to the conclusion that there must be some special reason why Hamlet is unable to avenge his father's death. Freud writes: "Hamlet can do everything but take vengeance upon the man who has put his father out of the way, and has taken his father's place with his mother—upon the man who shows him the realization of his repressed childhood wishes. The loathing which ought to drive him to revenge is thus replaced in him by selfreproaches, by conscientious scruples, which represent to him that he himself is no better than the murderer whom he is to punish." Freud goes on to explain the unconscious character of this mental content, and quotes the conversations of the prince with Ophelia as showing the sexual disinclination consequent upon his state of mind.

Mr. Barrymore sacrificed some of the analytical interest of Shakespeare's representation by cutting a good deal of the closet scene between the queen mother and Hamlet in Act III, no doubt out of deference to the standards of modern audiences, to whom the gross frankness of Elizabethan speech is offensive. The interested student, upon reading this scene, can hardly fail to be convinced of the grounds of Freud's interpretation.

Dr. Ernest Jones, of London, and Dr. Otto Rank have contributed to psychoanalytical literature interesting essays confirming Freud's theory of Shakespeare's great tragedy.

THERAPEUTIC ACTION OF IODINE.

Iodine is the specific medicament for lymphatic tissue whose hyperactivity it induces, namely, hyperactivity of the lymph nodes and spleen (so important in the treatment of scrofula and lymphatism), mononuclear leucocytosis in the blood of a persistent nature and differing from the polynucleosis produced by nucleinic acid. Finally, iodine is a microbicide, an antitoxic, and a destroyer of bacterial poison; it reinforces the natural agents of organic defence, hence increasing vital resistance.

Iodine possesses a stimulating action on the processes of disassimilation. When absorbed the drug divides into two parts, one being eliminated in the urine in the form of sodium iodide, the other combining with the proteins of the blood serum and giving rise to iodoalbumins, being rapidly fixed by the leucocytes which convey the iodine to the thyroid gland, lymph nodes and spleen. The albuminoid molecule is thus rendered more easily and more completely oxidizable; and still more the drug produces a transudation of the lymph into the lymphatic spaces and the resulting hydremia produces a true drainage of the tissues, relieving the cells of the waste product of nutrition, a fact which explains their possible recovery, as for example in asthma.

This lymphagogue action of iodine must be treated with respect and it should be borne in mind that it is above all marked in the iodides and that in infected or anemic subjects and thin individuals, iodine, even in small doses may increase the emaciation by its action on fat and the albumins. On the contrary, pure iodine possesses an intense hemopoietic and antiseptic power and a weak lymphagogue action.

Iodine increases the respiratory quotient, increases the activity of the pulmonary circulation, facilitates expectoration, thus disencumbering the bronchi, and hence relieving the patient's asphyxia. The drug is a basal dilator, regulates the work of the heart and lowers the blood pressure. It possesses a stimulating action on the thyroid, suprarenals and hypophysis.

Toxic phenomena occur only with the iodides. As to accidents of true iodism resulting from pure iodine, colloidal iodine, or the organic iodine compounds, it may be said that practically they are nonexistent. The accidents due to iodism are of a hyperemic nature and are the result of a brutal play of the lymphagogue power of the drug; they consist of oculonasal catarrh, bronchial catarrh, dryness of the throat, salivation, edema of the glottis, acne, and erythemata. The drug follows secondary routes of elimination, namely, the laryngeal, pharyngeal and bronchial mucosæ, the tears, saliva and sweat, and the principal way of elimination is by the urine.

These data permit of two conclusions, first, the multiple and energetic action of iodine, and second, the serious inconveniences resulting from the exhibition of the iodides. Hence the necessity of prescribing a chemically definite product, the best of all being an iodoorganic one, as these are well supported by the digestive apparatus and are practically devoid of any untoward effects if exhibited with all due care.

THE AGE OF UNREASON IN THE CULTS.

With respect to correct and proper teaching of public health matters, the irregular practitioners have fallen upon evil days. For many years regular medicine has been trying to educate the public in those matters which influence the prevention of disease and the prolongation of life and it has succeeded in some measure; but now there seems to be an overwhelming flood of misinformation and ill timed advice coming from sources which are wilfully perverting the truth. First, there are the osteopaths who are throwing science and reason to the winds and insisting that every disease can be cured by manipulation. The chiropractors are doing about the same thing and in some quarters there is a pretty quarrel on as to whether the osteopaths have learned their art (?) from the chiropractors or vice versa. But they are ably seconded by the Christian Scientists who even go one step further in denying the very existence of disease, yet they do not hesitate to attempt to heal by prayer that which does not exist.

The latest of the irrationalists is the exalted pharmacist, Dr. Coué recently in America, who has come forward with an age long theory that all disease can be suggested out of the mental sphere through selfhypnotism. The gullible public is taking this and other socalled teachings very much to heart, but of course, one need not be alarmed that any of these will persist throughout the ages; for it is a matter of common knowledge that most false doctrines have fallen by the wayside, and whatever good there is in any of them has long since become a part of the great science and art of medicine. The real harm that the followers of these cults do is their false teaching, and one may truly say that what they *do* is not nearly as bad as what they *say*. To deny the efficacy of vaccination; to attempt to pass laws which will forever hamper and prevent vivisection; to deny the germ theory of disease, and to refuse the succor of morphine in alleviating pain —all of these are bad in that they make it more difficult for scientific medicine to proceed with the great tasks she has set herself.

Recently a magazine, devoted to the interests of a health cult, ran a full page advertisement in several of the great metropolitan dailies. This advertisement was particularly ridiculous in that it stated that one could determine the day of his death, or, in its own phrasing, that "you can decide now when you will die." It goes on to say that fate does not set the date but, "We humans do that ourselves, depending upon the care we give this flesh and blood mechanism we call the body." Then there are cited feature articles to which especial attention is called, the first of which is Foods For Easy Maternity. This states that "If a woman will eat the proper kind of food there will be neither pain nor peril to childbirth." In other words, the accidents of gestation are not to be considered. To the writer of this "stuff," there is no contracted pelvis, no placenta prævia, and no infections of the genital tract. That, of course, is very ideal and much to be hoped for, but does not and never will exist, possibly even among angels. Another article has the caption Stop That First Sneeze. This intimates that hay fever is due to a lack of selfcontrol and that if one will suppress the first sneeze a cure can be effected. It mentions the case of a woman cured by this method. It has no interest in the pollen origin of hay fever or in anaphylaxis or the theory of the internal secretions as possible causes of this symptom complex.

Still another article that is even more pernicious states that Cancer Can Be Cured By a Cleansing Diet. This goes on to describe the case of a woman, "the lower half of whose stomach and intestines were a mass of cancerous tissue," but who is now in excellent health through eating the proper food. Unfortunately, some credence might seem to have been given this pronouncement by certain medical authors who have appeared in the lay press as advocating dietary treatment instead of surgical operation for the cure of cancer. The fallacy of diet as a cureall has been carefully nurtured by the osteopaths and chiropractors, especially in regard to the kind of bread one eats. One woman chiropractor with whom we are acquainted, makes bread and sells it to her patients and advises them never to eat any other kind if they would be well. This only shows to what extent the faddists will go and how very dangerous promulgation of their imaginings becomes, when, as we all know, anything that postpones early diagnosis and immediate surgical procedure means fatal procrastination in most cases. There are thousands of people who, whenever they read such "stuff," are eager to grasp at the floating straw, and who, if they are not destroyed by the folly of their own credulity, may spread a kind of untruth that will poison hundreds of minds against correct scientific teaching.

Akin to this sort of thing are the fancies of those singing teachers who tell their pupils that through some special method of breathing they can "inhale health," and never catch cold. It is, of course, just as reasonable to assume that one will never be hit by an automobile as to say that an acute infection of the airways can never take place if one breathes thus and so. Even the hardiest and most rugged individuals sometimes become infected with socalled colds and influenza, and in the epidemic some years ago many of the victims were strong, out of door individuals who had never been sick before, but who quickly succumbed.

Public safety can only be safeguarded by contradicting this information, by "scotching" it wherever it shows its ugly head, and by supplanting it with information which is absolutely accurate. It is not enough to talk excitedly at medical meetings or even to write in a lukewarm and general way, but wherever a specific instance is known, such as the flagrant one herein cited, we should immediately train our guns on that position and fight fire with fire.

ANNUAL REPORT OF THE UNITED STATES PUBLIC HEALTH SERVICE.

The Public Health Service of the United States has recently issued its fifty-first annual report, covering the one hundred and twenty-fourth year of its existence. The subject matter of the report is grouped according to the work of the seven divisions under which the bureau is operated. These are the divisions of scientific research, of domestic quarantine, of foreign and insular quarantine and immigration, of sanitary reports and statistics, of marine hospitals and relief, of personnel and accounts, and of venereal diseases. The year covered in this report, ending June 30, 1922, was eventful from a service viewpoint for two reasons—the increasing resumption of public health work, and the relinquishment of certain functions previously performed in relation to the care and treatment of exservice men and women. One of the scientific accomplishments of the year was the development of a new gas for the fumigation of vessels for the purpose of destroying disease bearing insects and vermin. Experimentation has indicated that it is effective, and that it can be applied with safety, and without damage to vessel or cargo.

The transference to the Veterans' Bureau of many of the activities relating to the medical care and treatment of veterans of the World War has greatly decreased the facilities and personnel of the service. On June 30, 1921, the total personnel of the Public Health Service was 23,078; on June 30, 1922, it was 9,357.

The policy of cooperating with other governmental agencies, both domestic and foreign, in public health activities has been continued. One feature of the extension of the permanent hospital facilities has been the establishment of a radio service for the relief of the sick on vessels at sea, and in broadcasting public health information.

An interesting fact shown by the report is that the development of rural sanitation has proved to be one of the most economical activities of the service from the viewpoint of measurable returns. Special studies have been made of industrial hygiene, stream pollution, disposal of human wastes, and certain endemic diseases, among them amebiasis, botulism, gonorrhea, leprosy, malaria, meningitis, pellagra, pneumonia, Rocky Mountain spotted fever, tuberculosis, trachoma, tularæmia, typhoid fever, and syphilis. Measures for venereal disease prevention have been proved so valuable and necessary that they will eventually be placed on a permanent basis in all the States. A series of public health institutes were held in a number of the larger cities of the country, and a conference on the future of public health in the United States and the education of sanitarians in Washington.

Prevention and quarantine of epidemic diseases was particularly successful during 1922, shown by the fact that, with the exception of localized outbreaks, there was an absence of such diseases during the year. Bubonic plague is perhaps the most widespread of all diseases of a pestilential character in the world, except smallpox. In 1921 this disease threatened to become partly epidemic in the South, but prompt and radical measures were applied to local conditions and served to prevent its spread. Yellow fever foci were reported in Mexico, Central America, and the coast cities of South America, but, in spite of the fact that close and active commercial relations were kept up with these countries, only five cases of fever reached domestic ports, and the disease was excluded. The same was true of cholera, smallpox, and typhus fever, so prevalent as an aftermath of the war in European countries. This was accomplished in part by the stationing abroad of trained officers of the service to help enforce the quarantine laws and regulations. All maritime quarantine stations at domestic ports are operated by the service, and all arriving aliens are examined. The opening of a new hospital for lepers has inaugurated the segregation of lepers in the United States.

WORKMEN'S COMPENSATION INSURANCE.

An interesting bulletin comparing the various forms of workmen's compensation insurance and their administration in the United States has recently been issued by the Bureau of Labor Statistics, Washington. Carl Hookstadt is the compiler of the bulletin. In 1919 the Bureau began an investigation of compensation insurance systems, the points upon which information was particularly sought being relative costs, security, and service of the various types of insurance carriers. Also, a study was made of the administrative procedure of State industrial commissions and funds, especially as regards accident reporting and claim procedure. A description of the claim procedure methods in each State is given. The investigation covers twenty States and two Canadian provinces.

A brief summary of conclusions is of interest. As to cost, it was found that under an exclusive State fund the cost to employers would be thirty per cent. less than under stock insurance and sixteen per cent. less than under mutual insurance. The total saving to insured employers of the United States, if all were insured in exclusive State funds, would be over thirty million dollars annually. Comparisons of service were difficult because of the great variation among insurance systems. As to promptness there was little to choose among the different types of insurance carriers. Most of the State funds were found to be more liberal than either stock or mutual companies. Some private companies are doing excellent safety work, but few of the States have done any effective work of this kind. As to security, so far no injured workman has lost his compensation because of the insolvency of State insurance funds, nor has any large mutual company become insolvent. Twenty-one States reported on self insurance; in fifteen of these no self insured employer has failed or gone into the hands of a receiver. Four systems of claim procedure are in use in the various compensation States. These are claim system, voluntary agreement or direct settlement system, adjudication of cases on basis of employer's and insurer's reports only, and hearing system. An accurate appraisal of the foregoing systems was difficult to make for methods of reporting results and factors entering into reports vary so widely. The claim system is used in nearly all State funds and by two or three commissions. Agreement systems were found in a majority of the commissions and in several funds. Several States have adjudication of claims on the basis of employer's and insurer's reports only. The merits of this system lie in its simplicity. In the exclusive fund States formal hearings are practically nonexistent. New York's commission holds a hearing on every compensable accident case. The survey showed that there are a large number of different methods of computing the average weekly wages in the various States, some established in the laws, others laid down in the rules of the administrative commissions, and some the outgrowth of custom and practice in actual cases. Application of these methods has not been always consistent. Even in States with identical laws, the actual application is often very different in effect. "This suggests the desirability of standardization of methods along as simple lines as possible, covering each particular class of cases. Many States have already attempted this, some with a good degree of success, but the wide variety of methods disclosed suggests the need of simplification and uniformity in order to secure to injured workers and their dependents a prompt and full settlement of their claims."

SALINE PURGATIVES IN RELATION TO THE ABSORPTION OF OTHER DRUGS.

It appears to have been shown that when certain drugs are being given, it is unwise to prescribe subsequently or simultaneously such purgatives as prevent or retard the absorption of these drugs. It is known that magnesium sulphate, sodium sulphate, sodium phosphate, and similar salts, caused increased secretion of fluid and retardation of absorption, with the accumulation of a large amount of serous fluid in the intestines through the osmotic action of the unabsorbed salt, which, instead of being absorbed, or the basic part absorbed so gradually, draws more fluid into the intestinal lumen.

Dr. D. T. Macht and Mr. E. M. Finesilver, of the pharmacological laboratory of Johns Hopkins University have recently been making investigations and experiments in this direction which, together with the results, they have described at some length in the *Johns Hopkins Hospital Bulletin,* September last. These experiments have established, beyond peradventure, that saline purgatives can and do affect markedly the absorption and consequent secretion of certain other drugs. These results are in keeping with the pharmacodynamics of saline purgatives.

Moreover, the experiments made it evident that the absorption and excretion of drugs, even when given by injection, are influenced to some extent by saline laxatives, after they have been administered previously by the stomach tube. The investigators state that undoubtedy this phenomenon has something to do with the concentration of the blood and the distribution of fluids in the body. It has been known for some time that saline purgatives will concentrate the blood, as is indicated by the blood count, and this has been emphasized recently by the work of J. Underhill (*Journal of Pharmacology and Experimental Therapeutics*, February, 1922). The experiments of Macht and Finesilver were made with potassium cyanide, chloretone as representative of the hypnotic group of drugs, several opium derivatives, and other alkaloids, such as cocaine, strychnine, atropine and quinindine, heart drugs, antipyretics, such as sodium salicylate, salol, aspirin, antipyrin, potassium iodide and urotropin, and of the antiseptics phenol and mercury bichloride. Macht and Finesilver are of the opinion that the results of their investigations and experiments done by physiological and chemical methods have a distinctly practical bearing, showing that it is a matter of some importance as to the kind of purgatives or laxatives administered with certain drugs. For example, experiments on cats revealed the fact that when digitalis was given with saline laxatives, its absorption and consequent toxic symptoms took place more slowly by far than when the drug was administered with water. The absorption and subsequent secretion of sulphonephthalein and sodium salicylate were affected markedly by saline purgatives. Also the absorption of phenol and mercury bichloride is affected in a like manner, which findings substantiate the findings of Macht, who in 1915 showed that the most suitable solution for lavage in acute carbolic acid poisoning was a saturated solution of sodium sulphate. It was demonstrated too that the excretion of urotropin was delayed by the administration of saline purgatives. The authors studied the relation of other laxatives, such as calomel, cascara sagrada, and castor oil in this connection, but did not find that any important influence was exerted by these drugs on the absorption and excretion of other medicaments.

VOLSTEAD.

Easily the most important protest, at least in so far as the medical profession is concerned, against the Eighteenth Amendment and the Volstead Act is the organization of the Association for the Protection of Constitutional Rights, an organization of practising physicians of New York, of which Dr. Samuel W. Lambert, of 130 East Thirty-fifth Street, is president. The whole country has an immediate and direct interest in the movement for many reasons. In the first place the medical profession, as conservators of public life and health, are a people apart, bound by the obligations of their profession to do all in their power to relieve human suffering and save human life. In the second place, they are licensed by the laws of every State in the Union to practise their profession and not to be hindered, and to exercise discretion in that practice. They spend years in training—but why enumerate?

The action is made all the more impressive by reason of the fact that the organizers are among the most prominent men in the profession in this or any other country and many of them strong advocates of total abstinence for their patients and the community generally. In its essence the matter resolves itself into the question: Has any mere legislator like Mr. Volstead, multiplied by whatever number of supporters were necessary to put through the Eighteenth Amendment and the Volstead Act, the right to prevent another—any other—from doing something which the laws of every State distinctly license him to do? The question could be thrashed out from even a more fundamental basis. Has any legislation a right to take away what no legislation can give, viz., the God given right to the exercise of his free will, in so far as that exercise does not impair the same right on the part of others? And can a man, lawfully practising his profession, by reason of that fact be made a criminal, an open and flagrant violator of the law, unfit to hold intercourse with decent, law abiding citizens, to say nothing of holding communion with his own selfrespect?

The effect of this action is to raise issues, vital both as regards the law itself and the conflict between the medical profession, or a large majority of it, and the law in a form which cannot be ignored, which must be recognized by United States Court action. Heretofore, protest has been made only spasmodically and of local or personal importance. The position of the medical profession is, or appears to be, based frankly upon a refusal to recognize the constitutionality of the amendment, or as much of it as conflicts with human rights as practised by the profession in the treatment of patients. The views of their opponents, in the existing state of public opinion, is absurd and untenable, and simply amounts to putting a premium on breaking one law as the sole means of giving relief under another.

THE BRITISH JOURNAL OF SURGERY.

One often hears expressed the opinion that men of science, so long as they have truth, care nothing for beauty. In some cases this is undoubtedly true, as, for instance, in that of the college professor recently quoted by the daily papers as having said that art is all "bunk"—only technic is to be admired. There are, however, notable exceptions to this rule. Some of these may be seen in several of the scientific publications, especially of the United States and of Great Britain. Among medical journals in this country, the *Annals of Medical History*, edited by Dr. Francis Packard, of Philadelphia, and published by

Paul B. Hoeber, of New York, stands out by reason of the beauty of its typography, illustrations, paper and general makeup. In Great Britain, the *British Journal of Surgery* is a notable example of the aesthetic possibilities to be attained by scientific publications. This magazine is edited by a committee of which Sir Berkeley G. A. Moynihan is chairman, and E. W. Hey Groves, editorial secretary. It is published in Bristol, England, by John Wright & Sons, Ltd. By the use throughout of a paper with a specially prepared glazed finish, the illustrations and plates, perhaps the special feature of the journal, are remarkably clear and definite, and permit of a wealth of the finest and most delicate detail, not only in the halftone reproductions from photographs, but also in the anatomical and surgical drawings and diagrams, which is not often found in the illustrations even of scientific works. Special attention has been given to making the color prints, appearing as plates and in the text as well, accurate and realistic. Many of the reproductions from photographs of complex surgical procedures are further illustrated by accompanying line drawings showing details. The type is rather small, but clear.

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News Items.

A Distinguished Foreign Visitor.—Dr. Leon Bernard, professor of hygiene in the University of Paris and secretary of the National Antituberculosis Association of France, arrived in the United States recently to spend several weeks observing American health methods.

Child Welfare Organizations Unite.—The two national organizations engaged in promoting the health of the children of this country have voted to unite under the title of American Child Health Association. The two organizations as heretofore known are the American Child Hygiene Association and the Child Health Organization of America; both having been devoted primarily to promoting the health of children.

Bequest to Pennsylvania University for a Department of Clinical Surgery.—Under the terms of a bequest made by Edmund A. W. Hunter, the University of Pennsylvania will receive $200,000 for the establishment of clinical surgery. The bequest was made with the provision that the addition to the university be known as "the Agnew and Hunter Department of Clinical Surgery" in memory of Dr. D. Hayes Agnew and Dr. Charles D. Hunter, son of the donor.

Assistants in Ophthalmology.—The Italian Medical Society of New York has been notified by the department of ophthalmology of the University of Rome, that two assistantships without salary are offered to American medical graudates of Italian extraction. Living expenses will be paid. For further information application should be made to the Societa Medica Italiana, 47 West Forty-second Street.

Dr. John J. McGrath Heads Bellevue Board of Trustees.—Dr. John J. McGrath, of 109 West Seventh-fourth Street, appointed by Mayor Hylan to serve as a member of the board of trustees of Bellevue and Allied Hospitals, was elected president of the board at a meeting of the trustees held in the hospital recently. At the same time the board drew up a resolution thanking the retiring president, Dr. John W. Brannan, for his services to the hospital.

College for Rehabilitation. — At a meeting held at the New York Academy of Medicine, a company was incorporated for the establishment of an American College of Rehabilitation for training workers in the field of reconstruction of the wounded and crippled. Major Franklin W. Johnson, of Columbia University, described the rehabilitation work carried on among disabled soldiers during and after the war. The sponsors for the new company are Dr. Fred H. Albee, Mrs. Clarence Cary, Martin A. Metzner, W. J. Hoggson, R. Gradwell, and Standish Chard.

Seventh Harvey Lecture.—The seventh Harvey Society Lecture to be given at the New York Academy of Medicine, Saturday evening, February 24, 1923, will be delivered by Dr. Leon Asher, professor of physiology, University of Berne. His subject will be The Building Up of the Organism by Chemical and Nervous Coordination and Regulation. The lecture by Dr. E. V. Cowdry, of the Rockefeller Institute for Medical Research, on The Significance of the Internal Reticular Apparatus of Golgi in Cellular Physiology, has been postponed until Saturday evening, March 10th.

An Interesting Hospital Site.—The Bronx Hospital has just purchased land for the construction of a new main building. This property has an interesting history. It was sold by Indians in 1648 to Col. Robert Morris, whose heirs held it until 1848. There was then one conveyance to James Herold, from whom the John Eichler Brewing Company bought it over fifty years ago, holding it until the present sale. With this addition to their holdings, the Bronx Hospital has a total frontage on Fulton Avenue of 211 feet and an increase of its present holdings of 151 feet on 169th Street. The old buildings will be used for a maternity hospital, nurses' training school, and dormitories.

The Dr. Sofie A. Nordhoff-Jung Cancer Research Prize.—Dr. Sofie A. Nordhoff-Jung, of Washington, D. C., has founded an annual prize of five hundred dollars bearing the title of "The Sofie A. Nordhoff-Jung Cancer Research Prize." This prize is destined for the encouragement of researches in the etiology, prevention and treatment of cancer. It will be awarded by a commission, composed of members of the University of Munich, Bavaria, and will be granted for the first time in December, 1923. The commission consists of Professor Borst, Professor Doederlein and Professor Sauerbruch, with Professor von Romberg as chairman. The award will be made as a recognition of the most conspicuous work in the world literature bearing on cancer research, done at a time antecedent to the allotment of the award. Though the prize will not be awarded on a competitive basis all research workers in cancer are invited to submit literature on this subject.

NEW YORK CITY'S PASTEUR CELEBRATIONS.

Louis Pasteur, familiarly known as "the father of bacteriology," was born on December 27, 1822. The centenary of his birth as that of perhaps the greatest scientific genius of all time has recently been celebrated in most of the large cities of the world. New York organizations and institutions held a number of these commemorative exercises in honor of the great Frenchman. January 10th was designated by the Mayor as Pasteur Day, and was celebrated in the public schools and elsewhere with appropriate exercises. The College of Physicians and Surgeons of Columbia University, in cooperation with other departments of the university, held on December 18th a memorial meeting at which the chief speaker of the evening was Emmanuel de Margerie of the University of Strasburg, exchange engineering professor from France. His subject was France's Estimate of Pasteur. Doctor Calkins, professor of protozoology, spoke on The Debt of Biology to Pasteur, and Doctor Lee, research professor of physiology, on The Debt of Medicine to Pasteur. On December 27th, Pasteur's birthday, a notable gathering took place at the American Museum of Natural History. This meeting was sponsored by the New York Mineralogical Club and the American Museum of Natural History, cooperating with the United States Department of Agriculture, the Department of Health of New York City, the New York Academy of Sciences, the New York Academy of Medicine, the Pasteur Laboratories of America, the New York State Department of Health, the Rockefeller Institute for Medical Research, and several other notable organizations. Dr. George F. Kunz, president of the New York Mineralogical Club, presided and made the introductory address. He was followed by Prof. Henry Fairfield Osborn, president of the American Museum of Natural History, who paid tribute to the great number of lives saved through Pasteur's discoveries, and emphasized his significance as a symbol of the ultimate relation between nature and the development of religious conceptions and beliefs. He represented the union of spiritual, intellectual, and physical well being. His greatest mission was to "show the way to the physical redemption of man." The next speaker the Hon. Gaston Liebert, Consul General of France, also emphasized the great scientist's belief in spiritual realities not yet probed by science, and gave a brief account of his origin and early life and their influence upon his character.

Dr. Hermann M. Biggs, health commissioner of New York State, spoke of the prophylactic treatment of rabies, Pasteur's most notable contribution to preventive medicine, and one of the most significant and important discoveries in the whole history of medicine. He outlined the history of Pasteur's work in this field, through the years of careful experimentation upon animals, with repeated successes in protecting them from developing the diseases, to the final test upon a human being in the person of the boy, Joseph Meister, who had been badly bitten by a mad dog some time before he was brought to the laboratory. The treatment was applied and proved a complete success. The publication of Pasteur's method of treatment was followed by an inrush to the laboratory in Paris by people from all over the world who had been bitten by rabid dogs. Four children sent from Newark, N. J., were the first Americans to be sent for treatment. Their expenses were paid by the *New York Herald,* and they were accompanied by Dr. Frank Billings, of Chicago. At this time Doctor Biggs was sent by the Carnegie Laboratory of the Bellevue Hospital Medical College to study the Pasteur treatment in Paris. His description of the great man in his laboratory was most interesting. Soon movements were on foot to establish Pasteur institutes in other countries. One was founded in New York, under Doctor Gibier, and later, a laboratory in Philadelphia. About 1901 the New York City Department of Health made arrangements to give free treatments. Since that time about two hundred a year have been treated, and the death rate in these cases has averaged about one half of one per cent. There has always been much discussion as to the death rate from rabies previous to the introduction of the Pasteur method of treatment; it has been estimated at between fifteen and fory per cent. In the forty years that have elapsed since the publications of Pasteur's report on the treatment of rabies, little of importance has been added to our knowledge of the disease.

Dr. George D. Stewart, president of the New York Academy of Medicine, made a brief talk, commenting upon the charm and sincerity of Pasteur's personality, which made him beloved by all and won for him at the time of his death a vote from the French people as "the greatest Frenchman." Doctor Stewart also outlined his work leading to the discovery of inoculations. Dr. Pierre Lecomte de Nouy, of the Rockefeller Institute for Medical Research, outlined Pasteur's work in bacteriology as the basis of modern surgical treatment. Lord Lister followed up this work begun by Pasteur, so that today it is no longer true, in the words of Valpeau, that "the prick of a pin is the open door to death," but, what with the sterilization of instruments, equipment, and everything that comes in contact with a patient, a surgical operation is no longer a preliminary to death from blood poisoning. Dr. Hideyo Noguchi, also of the Rockefeller Institute, said that all modern bacteriology follows the conceptions laid down by Pasteur. He was also the founder of the principle of serum therapy. He had the courage and conviction to persist in applying these principles in the face of much hostile opposition from many of his contemporaries. Major Henry J. Nichols, of the U. S. Medical Corps, gave an interesting résumé of the relation of Pasteur's work to military medicine. In the late war, about one half the deaths were due to infectious diseases. In the civil war, the proportion was three times as great. Most of the military medicine of the present day is based on the principles originated by Pasteur, including asepsis, antisepsis, and vaccination. Prof. C.-E. A. Winslow, of the department of biology and bacteriology at Yale University, outlined Pasteur's work in the four fields of science benefited by his discoveries, namely, industry, surgery, public health, and serology. His success in all the fields of his endeavor was due to his remarkable mastery of scientific experimental methods. The meeting closed with a display of lantern slides illustrating Pasteur's life, shown by Dr. Frederick Lucas, president of the New York Academy of Sciences.

Another notable celebration was that by the New York Academy of Medicine on January 10th, at which the president of the academy, Doctor Stewart, presided. The first speaker of the evening was Prof. Russell Chittenden, of Yale University, who spoke of the contributions of Pasteur as a chemist, namely, his work in the polarization of light, tartaric and racemic acids, alcoholic fermentation, etc. Dr. William H. Welch, of Johns Hopkins University, spoke on the subject of Pasteur's Contributions to Biology. He said that the great Frenchman was unique in four ways: 1, He was appreciated by men of all branches of science—physicians, chemists, biologists, surgeons, sanitarians, and agriculturists; 2, he was fortunate in his biographers; 3, his work illustrates the correlation of many branches of science—crystallography, fermentation, spontaneous generation, silkworm disease, infections, rabies—and shows an orderly progression throughout; 4, his discoveries were significant as opening up new sciences and new chapters in science. He was the founder of modern bacteriology. He made the first practical applications of public health methods. Doctor Welch believes that the opposition he encountered on the part of his contemporaries did much to emphasize his originality and to fix upon him the ultimate credit due him. His theories marked a new era in bacteriology, and he laid the foundations of our knowledge of yeast, fungi, nutrition, metabolism, sterilization, and pasteurization. The great thought that he always kept foremost in his mind was the idea of specificity. He was interested in pure as well as applied science; he felt little interest, however, in purely descriptive morphology; all his efforts were based on the significance of science to life. Dr. Erwin F. Smith, of the U. S. Department of Agriculture, spoke of Pasteur's work which retrieved the silkworm industry of France from disaster, and of how he taught the peasants to use preventive measures for the future protection of their industry.

Dr. Simon Flexner, of the Rockefeller Institute, discussed the Contributions of Pasteur to the Knowledge of Immunity and Therapy. He outlined his discovery of anthrax as a bacterial disease, of carriers of chicken cholera, and of his experiments in producing immunity by inoculation, leading ultimately to the preparation of vaccines for anthrax, chicken cholera, swine measles, and rabies. He showed also the relation of his work to modern methods of asepsis and antisepsis. Dr. Biggs spoke on the Pasteur Treatment of Rabies, and the meeting was closed by an address by Dr. William W. Keen, of Jefferson Medical College, on the Influence of Pasteur on Knowledge Concerning Surgical Infection and Puerperal Fever. Doctor Keen showed how Pasteur's discoveries as to infections laid the foundation for all modern methods for treating blood poisoning, gangrene, and other infections following surgical operations and childbirth.

This meeting at the Academy of Medicine marked the close of an interesting exhibit, opening December 27th, of Pasteur memorabilia, shown in the exhibition hall of the Academy. This was arranged chronologically to illustrate the various periods of Pasteur's life and work. It included photographs and prints of places made famous by association with his life, of members of his family and of his friends, of apparatus used by him in his work, of the Pasteur institutes in various countries, and of many other interesting relics; books and pamphlets, including biographies, and copies of his own works; autograph letters; case records; a full collection of beautiful medals and medallions commemorating himself and his work; and a number of busts, including the famous bronze bust by Naoume Aronson of Paris, loaned by him and exhibited for the first time. Other exhibits arranged in honor of the centenary were several demonstrating public health measures, shown at the American Museum of Natural History, and a number of special government exhibits sent from Washington, among them, an interesting demonstration of crystallization.

Another celebration was held on January 28th at the Town Hall under the auspices of Hon. J. J. Jusserand, Ambassador of France, Gov. Alfred E. Smith, Mayor John F. Hylan, Archbishop Patrick J. Hayes, Bishop William T. Manning, Dr. Nicholas Murray Butler, and Hon. Gaston Liebert. The hall was decorated with the Stars and Stripes and the flags of the European nations. Several musical numbers and the singing of the *Marseillaise* added interest to the program. Brigadier General S. Herbert Wolfe made the introductory address, and His Excellency, the Ambassador of France, gave a sketch of the life of Pasteur, with many interesting personal anecdotes. Dr. Butler spoke next of Pasteur's great contribution to the world, the revelation of the invisible universe, and the knowledge of it through scientific methods. "Pasteur was the apostle of work. No name in modern history is to be placed higher than his, as that of one of the chief servants and benefactors of humankind, and the first revealer of the intellectual power of man." Dr. John H. Finley was the next speaker, on The Debt of Science and Industry to Pasteur. Pasteur taught the world that there is no godliness without cleanliness. The study of chemistry turned him to the world of the infinitesimal, thence to bacteriology. Doctor Finley outlined his work with microorganisms. "He was like Prometheus—he brought a fragment of monumental truth to mankind."

Dr. Stewart, president of the Academy of Medicine, was the last speaker. He outlined the various achievements of Pasteur in chemistry leading to crystallography and the beginnings of stereochemistry and x ray spectroscopy; in fermentation, and its application to disease; in settling the question of spontaneous generation; in diseases of the silkworm, and in anthrax, chicken cholera, swine fever, and rabies. Before Pasteur, men knew about as much about symptoms and prognosis as they do now, but knowledge of causes was obscured by theory, so treatment was only guess work. Pasteur's studies in fermentation led to the investigation of causes, resulting in modern aseptic and antiseptic methods in surgical and puerperal cases. Pasteur's chief characteristics, according to Doctor Stewart, were industry, will, clear thinking, and intense patriotism. He was practical in his work rather than purely experimental.

LONDON LETTER.

(*From our own correspondent.*)

London, *January 9, 1923.*

CURATIVE SUNLIGHT.

The value of light and especially sunlight in the treatment of certain diseases is now more firmly established than ever. Dr. C. W. Saleeby, who lectured on the subject before the King Alfred School Society on January 3d, said that he wished he could substitute sunlight and milk for beef and beer in the creed of Englishmen. Experiments had shown that sunlight was an incomparable antiseptic. It killed the tubercle bacillus. No antiseptic approached the advantage of sunlight in relation to tuberculosis, and it was applicable to other diseases. Victims of tuberculosis placed in the sunlight had been transformed into healthy children. Notwithstanding all the evidence in favor of this form of treatment, all over England children were allowed to lie in the dark in institutions supported by charitably disposed persons, and these children were slowly traveling to premature graves, because the curative value of sunlight was unknown to their parents or to those who had charge of them. As a child required food, air and water, so also did it require sunlight.

GROWTH OF CHARACTER.

Dr. David Forsyth lectured recently before the National League for Health, Maternity and Child Welfare on the Growth of Character. Any leading features found in the character of the adult could, he said, be recognized by psychoanalytical investigation of the first few years of life. One of the happenings which could influence a child's character was the loss of its mother. It might ultimately cease to think of her, but the emotion felt at the time would influence its character permanently in the time to come. The birth of the second child had also its effect on the first child's mind, for it soon realized that it no longer enjoyed the love of its parents exclusively; thus were jealousy and disappointment bred. If punished for its jealousy, the child resented the attempt to check that feeling, and that had an influence on the formation of its character. Analysis had conclusively demonstrated that the first wish that could be detected was the wish to become reborn. That wish could be seen acting until adult life. There were people who were always protesting against hurry and strife. It could be traced back to their early days, when their first wish was to be done with the world straightaway.

PREVALENCE OF CANCER AND APPENDICITIS.

Diet is held by some to be the predominant cause of cancer and of appendicitis to a lesser extent. In proportion to the increase of meat consumption, according to certain authorities, cancer and appendicitis have increased, and this is the view taken by Dr. G. A. Casilis de Pury in a letter published in the *Lancet,* December 30 last. However, as Dr. Harry Campbell has pointed out in a letter published in the same journal of January 6th, preagricultural men were more carnivorous by far than human beings of the present day. There is no evidence extant that preagricultural men suffered greatly from cancer or appendicitis. Among the Esquimaux who live almost wholly on flesh, cancer is said to be unknown. While Dr. Campbell is one of those who believe that unsuitable diet does predispose to both cancer and appendicitis, he does not think that meat *per se* is responsible for this predisposition. Unsound meat may have this effect but not sound meat. Simplicity and regularity of diet, in his opinion, have more to do with warding off these two diseases than the proportion of animal food in a diet. Also Dr. Campbell is somewhat sceptical as to the alleged or apparent increase of cancer and appendicitis during recent years. He asks if this assumed increase is not to some extent attributable to improved methods of diagnosis.

CANCER RESEARCH IN 1922.

The close of the year 1922 has shown a twelve months' wonderful record of progress in the treatment of cancer and in the identification of specific causes capable of producing the disease. At the London Cancer Hospital a great deal of time has been devoted to research. Experimental cancers have been produced in small rodents by the continued application of irritant substances obtained from paraffin oil, shale oils, arsenic and soot. The results have been microscopically examined, photographed and recorded and the data thus secured, together with that of other more extensive experiments still proceeding are expected to furnish valuable indications to the specialists employed in combating the terrible scourge of cancer.

AWARD OF ROYAL SOCIETY MEDALS.

The Royal Society Medals for 1923 have been awarded as follows: The Copley Medal, to Sir Ernest Rutherford for his researches in radioactivity and atomic structure; the Rumford Medal to Professor Pieter Zeeman, for his researches in optics; a Royal Medal to Mr. J. Bancroft, for his researches in physiology, and especially for his work in connection with respiration; a Royal Medal to Mr. C. I. R. Wilson, for his researches on condensation nuclei and atmospheric electricity; the Davy Medal to Professor J. E. Thorpe, for his researches in synthetic organic chemistry; the Darwin Medal to Professor R. C. Pannett, for his researches in the science of genetics; the Buchanan Medal to Sir David Bruce, for his researches and discoveries in tropical science; the Sylvester Medal to Professor I. Levi-Civita, for his researches in geometry and mechanics; the Hughes Medal to Dr. F. W. Astor, for his discovery of isotropes of a large number of the elements by the method of positive rays.

DOCTORS AND ADVERTISING.

An important discussion took place a short time ago at a meeting of the British General Medical Council with regard to doctors and advertising. Dr. R. A. Bolam moved that it be submitted to the executive committee to consider and report upon the prevalence of oblique or indirect advertising by medical practitioners in the lay press. The object of the resolution, said the mover, was to elicit in some way a pronouncement from the council on certain developments in advertising chiefly through the lay press, which might if it were allowed to continue tend to lower the traditions of the profession in the eyes of the community. Since the issue of the council's warning seventeen years ago it was only on very rare occasions that such blatant forms of advertising, such as the distribution of hand bills commending any particular practitioner, was indulged in, but there were other more subtle and oblique methods which had gradually crept in. There was, for example, the practice of inserting in certain well known papers in the Court Circular column, in which advertisements might be included, statements in personal notices of the fact that a deceased person, for instance, was a relative of "so and so," the well known physician. Then there was the case of notices of engagements of marriage, in which the opportunity was seized for retailing for public consumption the qualifications and the address of the bridegroom or the father of either of the contracting parties.

Objection might also be taken to the notice of the fact that a certain person had returned from illness, and was now resuming his occupation at a certain address, and giving the telephone number. Notices such as these might come very readily within the definition of an advertisement. In the ordinary lay press practitioners were advertising either unwittingly or with their consent. Correspondence often appeared over the names of medical men expressing opinions on various subjects. Then there were advertisements of practitioners by or in connection with the condition of their patients.

There were cases of more or less direct advertising. One was where the doctor advertised that he received patients at a certain address, and that certain advantages were to be obtained at that address for a specified fee. The name of the doctor was not given, but the system of a box number reference was adopted. Dr. Bolam went on to refer to various cases which had occurred during the past few months of interviews in the lay press with general practitioners. They ranged from a chronicle of the experiences of doctors of liners at sea, who performed operations by wireless and combatted epidemics, and there were portraits and the specific names of those gentlemen in interviews on such important subjects as the spread of cancer and the possibilities of its treatment, wherein the gentlemen concerned were described as experts on this particular subject, and their names were given, together with sufficient information as to where they were to be found. Moreover, Dr. Bolam observed that women doctors were not immune from the indiscretions of journalism. There existed, however, he proceeded to say, a much more serious state of affairs where deliberate intent might be imputed to the practitioners involved. There was the case of the reputed communication by one person to a series of lay papers on one specific topic, in which occurred some such phrase as "my extended experience" in a certain type of work. It was important that the public should be informed on all matters of importance involving medical questions, and if the object of this publicity was the proper instruction of the public, then it was quite right that the articles should appear, but he did not think that the names of the medical writers should be given. Generally speaking, the medical men who were most often quoted in the press were not necessarily those whose opinions carried most weight in the medical profession or with the educated public. The extension of such a system as now prevailed might lead to a competition for public notice, in which the abler and more scrupulous members of the profession must be left behind the men who were professionally inferior, which would thus destroy the traditions of selfrespect which had given the profession its present high status. On the suggestion of Sir Donald McAlister, president of the General Medical Council, Dr. Bolam altered his resolution to read, that it be remitted to the executive committee, in consultation with the legal adviser, to consider and report upon the expediency of amending the council's warning notice with effect to canvassing and advertising, so as to make its scope more clear and comprehensive.

It may be said that while direct advertising by medical practitioners can be easily and effectively dealt with by the General Medical Council, the prevention of indirect advertising is very difficult. The definition of advertising, or rather as to what constitutes an advertisement, is in itself difficult. Distinction between the ethical and unethical notice of a medical practitioner in the lay press is hard to draw. Still the warning from the General Medical Council should serve its purpose.

SMALLPOX AND VACCINATION.

The outbreak of smallpox of virulent type in London, which has not wholly subsided, is no doubt largely due to the unprotected state of the population. Smallpox in its worst form was practically stamped out before the war. Within recent years many thousands of people have evaded the Vaccination Act, 1907, on the plea of conscientious objection to the procedure. A large proportion of these had no valid objection to vaccination, but evaded their obligation with regard to their offspring in order to save themselves a few days' inconvenience. There is a large section of the population of this country unprotected against the disease, and there are also on all sides an ample stock of smallpox virus ready for importation. Consequently, with these two factors in operation, it might be difficult to prevent the development of an epidemic, even with the greatest watchfulness.

In answer to a question asked in the House of Commons on November 29th last, Major Boyd-Carpenter said the present outbreak of smallpox was not confined to London. Cases of the disease had occurred during the present year in fifty-six districts outside London and in seven metropolitan boroughs; 893 cases had been discovered and twenty-six deaths had occurred; in 275 of the cases the patients had been vaccinated; 608 were either unvaccinated or showed no evidence of vaccination; and in seven cases there was no information as to vaccination.

GLAND THERAPY.

Gland therapy is very much to the front in these days and considerable progress is continually being made in this direction. The importance of the internal secretions is becoming more and more obvious and consequently means to keep these in smooth working order are being sought. The first triumph of organotherapy was with medicinal preparations of the thyroid and it seems that the latest is the discovery of insulin, or rather the obtaining of insulin, which it is stated has the most favorable effect upon diabetes. While it is early yet to predict that a cure has been found for diabetes, at least it can be said that the omens are propitious and augur well for future successes in the field of gland therapy.

Book Reviews

THE WORKS OF PASTEUR.

Oeuvres de Pasteur. Tome Premier Dissémtrie Moléculaire Tome II. Fermentations et Générations Dites Spontanées. Paris: Masson et Cie Paris, 1922.

The works of Pasteur have been assembled and are being brought out under the able editorship of Pasteur Vallery-Radot. This will be a distinct boon to medical literature. The papers of Pasteur have been scattered through many diverse channels, journals of chemistry, reports, private correspondence, and have found lodging in many sundry places. These two volumes are the first of seven which will be brought out in chronological form. The first contains his work on crystals, molecular dysymmetry. The second is devoted to fermentation and socalled spontaneous generation. These works, coming at the time when the great master's centenary is being observed, should receive a wide reading. They are interesting, not only from the tremendous rôle they played in firmly establishing present scientific medicine, but they give an insight into the mind and methods of one of the world's most painstaking workers. When we consider the quality of work he did as revealed from his original work and the improvements that have since developed in laboratory facilities, we more than ever wonder how he was able to achieve his tremendous results. The world was enriched by this great man. We can learn a great deal from his works. We owe a debt of gratitude to Pasteur Vallery-Radot for the compilation of this important work.

DEMENTIA PRECOX.

The Constitutional Factors in Dementia Precox. By Nolan W. C. Lewis. Illustrated. New York and Washington: Nervous and Mental Disease Publishing Company, 1923.

Much work has been done by various observers on the constitutional factors in dementia precox. This monograph by Lewis is one of the most fundamental that has appeared. His approach has been the most logical and his survey the most extensive. Most important among his pathological findings is the small size of the heart. The universality of this cardiac deficiency, which by the way does not admit of hypertrophic changes under stress, has been noted in the dementia precox cases of the hebephrenic and catatonic types alone. The paranoid types present a distinct pathology the nature of which he promises to discuss in a future communication. Another point worthy of consideration is the susceptibility of the patients to tuberculosis. This, it may be argued, could be due to the institutional life led by the patients, but the absence of a similar occurrence in other forms of mental disorder and the possible relationship between the cardiac deficiency, organic and functional as well as the inability of organic compensation, would lead to the acceptance of Lewis's hypothesis.

Important among the findings is the general atrophic or sclerotic condition of practically all the glands of internal secretion. This includes thyroid, adrenals, pituitary, and gonads. This would correlate the findings of Mott and Such of England and Madrid and certain Swiss and German workers. The difficulty in the past has been the attempt to fix the blame on some one set of these glands. From the autopsy reports in this monograph it will be seen that the lesions are widespread and have some common etiological source.

This monograph is the first in the series where illustrations have been used. No doubt this innovation will find favor for other works of psychiatry and will enhance their value.

On the whole this work of Lewis's should be read with care by all interested in the widespread disease of dementia precox. To have a work of this character done here in America will reflect to the credit of the man and the institution where he was able to bring his researches to a conclusion. In the last few years by far the most valuable work done in psychiatry in this country has come from St. Elizabeth Hospital in Washington. Standing in the foreground is the work of Kempf and now this excellent monograph by Lewis. This has been made possible through the influence of Dr. William A. White, who has done his share in bringing psychiatry into its own in this country. But this should be a review of Lewis's book and too much praise could not be given it. However, it is certain that he would not object to a word of commendation to that excellent institution in which he formulated his conclusions. This book of his should have a wide reading.

FREUD.

Vorlesingen zur einführung in die Psychoanalyse. Von Prof. Dr. Sigm. Freud. Vierte, durchgesehene auflage. Mein Internationaler Psychoanalytischer Verlag, 1922.

The fourth edition of the original German text of Freud's well known lectures which appeared in this country under the title of *A General Introduction to Psychoanalysis.* The book contains a series of thirty-eight lectures. In its pages we meet Freud the genial genius as he presents the groundwork of his findings in that vast and hidden world, the unconscious. He begins with the simple lessons learned in the processes of forgetting and goes on to the use of psychoanalytic therapy. For those who are familiar with German no happier medium could be selected for a study of the fundamental factors involved in Freud's theories.

REPRODUCTION.

The Physiology of Reproduction. By Francis H. A. Marshall, with contributions by William Cramer, James Lochhead and Cresswell Shearer. Second revised edition. New York and London: Longmans Green & Co., 1922.

We are fortunate in having a book of this type written, or more properly supervised, by so able and conscientious a worker as Marshall. Of the importance of this topic there can be no doubt. Moreover, too little consideration has been given this most important subject in general works on physiology. To find a reason for this would not be difficult, for the taboo on sex has extended to science as well as the world we live in.

Marshall has presented his topic from many angles and created a monumental book—a book that may well serve as a source book to those engaged in many fields. The physician will find many points of interest and practical value. The recent findings in endocrinology as related to the gonads have been included. Some of Steinach's experimental work is carefully reproduced. Gynecologists, anthropologists, students of sexology and many others will find much useful information here. This second edition has long been needed, for the first was out of print and nothing has replaced it.

EAR, NOSE, AND THROAT.

Diseases of the Ear, Nose and Throat. Medical and Surgical. By WENDELL CHRISTOPHER PHILLIPS, M.D. Sixth Revised Edition. Philadelphia: F. A. Davis Co., 1922.

The latest edition of this standard work contains a number of notable additions which materially increase its value as a textbook of reference for the practitioner and of instruction for the student. The chapters on the adult tonsil, on chronic ethmoiditis, on suspension laryngoscopy, on bronchoscopy and esophagoscopy, on blood tests in the septic intracranial complications of otitis media, and others have been revised, and that on laryngectomy for malignant disease of the larynx has been greatly extended and elaborated. Some methods and procedures which have become obsolete have been eliminated, such as a number of the old punch operations on the nasal septum. The illustrations are numerous and, generally, of a high degree of excellence technically and educationally. The best, perhaps, are the semidiagrammatic drawings by Bosse from life. The photographs of operative scenes are, on the other hand, somewhat lacking in definition of detail. Phillips's work is of necessity a bit sketchy in its consideration of physiology and pathology of audition, equilibration, and respiration, but there are no significant omissions. The author is to be congratulated on the way he has brought his work up to the level of the times and, in particular, on the chapters dealing with tests for rotational nystagmus, the operations for purulent labyrinthitis, and that on sinus thrombosis.

OBSTETRICS.

Obstetrics for Nurses. By EVERETT DUDLEY PLASS, M.D. New York and London: D. Appleton & Co., 1922.

The author has endeavored to furnish the nurse with a condensed textbook on obstetrics, which is intended to be an improvement on existing books couched in such language as she can understand and stripped of all unnecessary details. The detailed instructions in technic have been omitted intentionally, as hospitals vary their technic according to their individual needs. It is not a practical treatise, but rather a scientific work, upon which the nurse may base her practical nursing. However, the scientific and theoretical aspects of obstetrics are treated in a manner far in advance of the nurse's needs; in fact the book could serve as an excellent primer of obstetrics for medical students. While it is true that the nurse is the hand maiden of the physician and should therefore know and be conversant in medical matters, especially in the matter of educating the public in such matters (an important part of her duties), most of the material contained in this book can never be used for that purpose; besides, the subjects that would be of popular interest are not sufficiently emphasized. The author admits that his book is a condensation of Williams's *Obstetrics* and as such it can, at best, serve the nurse only as a reference book. For that it is most suitable.

PERICARDITIS.

Bibliotheque des Connaissances Medicales. Dirgee parle DR. APERT. Les Pericardites Aigues, par DR. BLECHMANN. 27 Figures. Paris: Flammarion, 1922. Pp. 278.

This small volume is devoted to a presentation of the etiology, symptomatology and treatment of acute pericarditis. The difficulty of diagnosis is reviewed and the many signs and symptoms which have from time to time been considered pathognomonic of this condition are critically discussed. The author makes frequent references to the work of other men but, unfortunately, gives no bibliography. The latter would contribute a good deal to the value of the book. For the exploratory puncture of the pericardium, Dr. Blechmann recommends the epigastric route, inserting the needle in the median line at the tip of the xiphoid cartilage. Several chapters are devoted to a critical review of the indications for and the various methods of pericardiotomy. The monograph can be recommended as presenting an adequate review of the subject.

EXERCISE.

Physical Exercises for Invalids and Convalescents. By EDWARD H. OCHSNER. Second Edition. St. Louis: C. V. Mosby Company, 1922.

This booklet is designed as a manual of calisthenics for convalescent patients and for sedentary workers who do little physical work. It should be of real value to physicians in planning exercises for their patients. The exercises are well described and illustrated.

DIABETES.

A Clinical Treatise on Diabetes Mellitus. By MARCEL LABBÉ, M.D. Translated, revised and edited by Charles Greene Cumston, M.D. With Four New Chapters by the Author and Three by the Editor not included in the French Edition. New York: William Wood & Co., 1922. Pp. viii-382.

This book is the result of the author's many years of experience in the symptomatology and treatment of diabetes; it also includes a discussion of the pathogenesis and pathology of this disease. Great stress is laid upon the metabolic study of the diabetic patient —much more than is found in most treatises on the subject. The significance of various symptoms are studied in the light of these metabolic investigations. The relation of diabetes to epilepsy, typhoid fever, edemas and tuberculosis is taken up in detail. The treatment of tuberculosis in diabetes, of intertrigo and of erythema of the vulva is given. The possibility of an infectious origin of diabetes is discussed. The hepatic, pancreatic and bronzed forms of diabetes and their underlying pathology are dilated upon. Diabetes is also studied in its relation to endocrinology and metabolism. The various forms of treatment are evaluated. The clinical aspects of acidosis and diabetic coma and their treatment are given special attention. The biochemistry of diabetes is not neglected.

On the whole, this book strikes one as being something different from the usual run of treatises on this subject. Much of what has been said in the past is here viewed from an entirely different angle. Some of the theories expressed are novel and unique; many of the author's conclusions are quite illuminating and seem to be distinct advances in the study of this subject, in view of the fact that there is still much to be learned about this somewhat obscure disease, constantly increasing in frequency.

NEUROPSYCHIATRY.

System der Neurose. Von Dr. Emil Kügler, Berlin, Wein: Urban und Schwarzenberg, 1922.

A rather presumptuous title for the material presented. Kügler leans toward a mechanistic foundation for the basis of his work. There is much interesting material presented although it cannot all be classed as fundamental.

ULCER.

Neuere Auschanungen vom Wesen des Ulcus pepticum ventriculi und Duodeni. Von B. Gruber und E. Katzenstein. Halle a.S: Carl Marhold Verlagsbuchhandlung, 1922.

Gruber and Katzenstein coincide with Hart's views that the prognosis of duodenal ulcer is about the same as that of gastric ulcer. With regard to the transformation of a peptic ulcer into cancer the authors are inclined to consider such an event quite rare. The statistics of Hansemann and Ronjetzny show that about three to five per cent. of gastric cancers take their origin from an ulcer.

DERMATOLOGY.

Lehrbuch der Hautkrankheiten fur Aerzte und Studierende. Von Prof. Dr. Max Joseph. Neunte Auflage. Leipzig: Georg Thieme, 1922.

The present edition of this well known publication has been abbreviated to a considerable extent at the request of the publishers for commercial reasons. The author's desire to amplify his eighth edition in all directions would have placed the cost of the work beyond the limits of the consumers' purse. Nevertheless all of the recent advances have been incorporated.

SOCIAL WORK.

A Form of Record for Hospital Social Work. By Gertrude L. Farmer. Philadelphia, London, and Montreal: J. B. Lippincott Co., 1921.

The six chapters of the little manual of eighty-one pages are devoted to choice of record form; the short service record, the five by eight record, the extension folder, further uses of the extension record system and illustrative records. While primarily intended for hospital extension work and for the benefit of the discharged patient the matter is naturally of interest to all social workers.

PROHIBITION.

The Eighteenth Amendment. By Charles Taber Stout. New York: Mitchell Kennerly, 1921. Pp. x-216.

An important topic is badly handled in this book on prohibition. While the American Medical Association may have many faults—this we shall not discuss for the moment—yet it is unfair to accuse them of iniquities of which they are guiltless. An unmerited attack is made upon one of the workers of the College of Physicians and Surgeons of Columbia University, which proves nothing. There is enough evil to combat without unjust accusation. Better and more fundamental data should have been used to make the book of value.

PARASITES.

Die durch tierische Parasiten hervorgernfenen chirurgischen Erkrankungen der Bauchhohle. Von Prof. Dr. H. Kehl. Halle a.S: Verlag von Marhold, 1922.

Kehl recommends an anus preternaturalis cæcalis in severe cases of chronic amebic dysentery. Kehl does not wait too long before advocating this procedure. Whenever there is sufficient suspicion of a liver abscess Kehl advocates exploratory puncture and, if pus is found, immediate operation. In echinococcus of the liver, operation is always indicated, as there is as yet no other way of treating this affection. The monograph is very instructive and deserves commendation.

GOUT.

La Goutte et Sa Cure Cure Hydro-minerale (Etudes d'Hydrologie Clinique). Par le Professeur agrége Maurice Loeper, et les Docteurs Flurin, Glenard, Joly, Paillord, Piatot et Pierra. Price 7 francs. Paris: L'Expansion Scientifique, 1921.

This brochure of 144 pages comprises seven essays. Loeper begins with uric and oxalic acid gout, Piatot discusses the articular, muscular, and remalgiform symptoms of gout, Joly gouty phlebitis, Flurin gouty bronchitis, Pierra uterine congestion of the gouty, while Paillard and Glenard cover the hydromineral treatment of gout.

PSYCHIATRY.

Untersuchungen Uber Die Korporlichen Störgen bei Geisteskranken, Von Otto Wuth, mit 63 textabbildungen. Berlin: Von Julius Springer, **1922.**

A carefully compiled statistical study of laboratory findings in the various psychoses and epilepsies. Much original work of value is presented with a most extensively compiled literature.

TUBERCULOSIS.

A History of the National Tuberculosis Association. By S. Adolphus Knopf. New York: National Tuberculosis Association, 1922.

The progress of this institution, founded in 1904, is reported in salient detail. The early struggles of the association in its pioneer stages, in the combat with tuberculosis, and the final organization of the National Tuberculosis Association, are described. A large number of bibliographical sketches and photographs of the men engaged in this most humane and constructive work are presented. The book, however, would be more complete and accurate if our very modest author would tell of some of his own energetic activities in the movement. Those who know how tireless he has been and how earnestly he has applied himself will regret the fact that he did not make adequate mention of his work. The book should prove of great value in many fields. Dr. Knopf is to be congratulated on the service he has rendered.

FICTION.

Escape. By Jeffery E. Jeffery. New York: Thomas Seltzer, 1922. Pp. 325.

Emmy, the heroine of the book, is, after her father's death, the one thinking member of a hopelessly stupid, hidebound, middleclass English family. She finds their limited, smug suburban life unbearable, and starts on a career of "escape." The possession of good looks, a good mind, and practical ability carry her along through "Emancipation," in which, after a dull period of married life from which Providence kindly relieves her, she enters upon a remunerative professional venture, attended eventually with the luxury of a London flat and educated, well to do friends. In the next part of the story, "Illusions," she finds her comparatively luxurious life far from satisfying, her work unfruitful of all but material compensations, and a love episode, based upon passion alone, barren of everything but disillusionment. She finally solves her problem of escape in "Compromise," by discovering that there is no escape, as she conceived it, for those big enough to live life fully and truly. Freedom lies only in the capacity to adjust to the rules of life's contest; in subordinating the individual to a purpose that serves the whole. Personal growth comes from contacts that mean, not security and satisfaction of self alone, but an effort to adjust and to grasp new and larger meanings. The basis of this new progress comes to be for Emmy in her married life with Barty, a free thinker of socialistic tendencies, who has the visionary's scorn of his wife's common sense and practical appreciation of the value of money, but whose ideals of a larger life lead Emmy out of her narrow, individualistic lines of thought and action. Alike in their realization that service alone gives meaning to living, and in their love for each other, they yet differ sufficiently to stimulate always a mutual interest, and to ensure a mutual development. The book is well written and the story admirably told. Throughout the reader has a rare sense of actuality, naturalness and wholesomeness.

SOUTH SEAS.

Atolls of the Sun. By FREDERICK O'BRIEN. New York: Century Co., 1922. Pp. 508.

Another, the third of O'Brien's charming, intimate descriptions of his South Sea experiences. Adventure, unusual situations and quaint episodes, all with the background of Polynesian beauty, make the book replete with interest. This is O'Brien's third visit and his third book. He is a conscientious writer and his readers are rewarded by his painstaking sincerity.

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Medicoliterary Notes.

The Harvard University Press has issued a series of eleven small volumes under the general title *Harvard Health Talks.* Each booklet consists of a lecture delivered at the Harvard Medical School by a prominent physician. Among the subjects covered are diseases of the tonsils, the skin and the heart, cancer, and pneumonia.

* * *

The autobiography of Madame Curie will be published in the near future by the Macmillan Company.

* * *

In view of the frequent difficulty in securing a sufficient number of competent physicians in outpatient departments of hospitals, the Associated Out-Patient Clinics of the City of New York have released a circular showing how the establishment of a proper relationship between the ward service and the outpatient service will tend to solve the above mentioned difficulty and to add to the efficiency of both services. Four principles are recommended and explained: 1, Unified organization of hospital and outpatient staffs; 2, continuous service, signifying that the director or responsible head of each service be continuously in charge, and that the principle of continuity of care of the patient be maintained; 3, a unified system of medical histories for both departments, with a single record room for both; 4, the use of outpatient departments for education and research by practising physicians and by institutions affiliated with medical schools or with postgraduate work.

* * *

Penal Discipline is the title of one of Dutton's recent publications. Its author is Mary Gordon, an Englishwoman who was for many years an inspector of prisons. The book studies and compares the penal systems of the United States, France and Holland.

* * *

In a digest of its forthcoming annual report the clinic of the Cornell University Medical College states that distinct progress has been made during this first year of its effort to provide medical service to persons of moderate means, without interfering with the practice of the private physician. The Clinic holds five afternoon and two evening sessions every week. During the year 113,981 visits were made to these sessions by 22,409 persons.

* * *

McClure's Magazine is running a series of popular articles on child psychology. The January number contains the first of these. The Backward Child and the Prodigy, by Ruth Danenhower Wilson, who takes the stand that the backward child has been shown to possess as great an opportunity for success as does the infant prodigy. Among examples of stupid children, she quotes the names of Sir Walter Scott, Darwin, Linnaeus, Poe, Whistler, and Rousseau.

* * *

Representative Cable of Ohio offered a resolution in the House on December 30th requiring the application of the intelligence tests used by the army to immigrants in order to perfect the present tests.

* * *

Harper's Magazine for January contains several articles of unusual interest, among them a rather satirical discussion by Katharine Fullerton Gerould of American socalled freedom, entitled Freedom in the Land of the Free; Gamaliel Bradford has a study of Benedict Arnold; W. L. George contributes one of his inimitable essays called The Art of Courtship; Sheila Kaye-Smith has a short story on A Day in a Woman's Life.

* * *

Walter de la Mare has in the *Yale Review* for January a charming fantasy called Lispett, Lispett & Vaine, the story of a house who have for many years been the creators of marvellously beautiful fabrics. De la Mare is this year's recipient of the famous James Tait Black Memorial Prize offered by Edinburgh University for the best novel of the year, in their opinion, *Memoirs of a Midget.* Last year D. H. Lawrence was awarded the prize for *The Lost Girl.*

Practical Therapeutics

THE USE OF TRANSFUSION IN CONDITIONS OTHER THAN ANEMIA.

By Edward H. Goodman, M. D.,
and John Speese, M. D.,
Philadelphia.

In presenting this brief paper we are not armed with a large series of cases, but fortified merely with the conviction, that the time is set for an extension of medical indications for the use of transfusion. Transfusion of blood from man to man or from animals to man dates back almost as far as the art of healing itself, but not until recent times has the procedure been made so safe that its employment may be regarded as almost free of danger. The discovery of three distinct groups of isoagglutinins by Landsteiner and the discovery by Moss and almost synchronously by Ottenberg of four groups placed the risk of causing damage by promiscuous blood transfusions upon those who transfuse in disregard of proper grouping and removed any risk from those who perform transfusion, observing previously the laws of proper typing. The technic of the operation, if such a title does not carry too much import, has been perfected so that any one may easily learn its details, and the giving of a transfusion, by the citrate method, amounts to scarcely more than the giving of normal salt solution by vein. There is at the present time a debate concerning the advantages of whole blood, and the disadvantage of citrated blood, and vice versa, a question which scarcely concerns us, although in passing we confess to the use of the citrate method.

There can be no doubt about certain conditions which are distinctly benefited by transfusion, notably anemia from hemorrhage and anemia from blood disease. The literature of the past five years concerning these teems with records which leave no room for cavil. Here and there in this mass of literature one finds reference to other uses for transfusion, to indications for its employment in cases other than anemia. We find shouts of approval from those who have made use of it in sepsis following war injuries, an echo to this of its possible value in other forms of sepsis, loud praises of its virtue in eclampsia, a whisper of its success in nephritis, a plea for its trial in acidosis. In French articles we find an adventurous spirit transfusing convalescent typhoid blood to check the course of active typhoid fever, transfusing variola patient with convalescent smallpox blood, using transfusion in meningococcemia, measles, scarlet fever, influenza, bacillary dysentery, diphtheria, tuberculosis, intoxications, pregnancy, pellagra, benzol and gas poisoning. Not always do we find success, for failure awaited the observer in dysentery, tuberculosis, and in diphtheria, but nevertheless, these researches in biochemistry and immunology proceed.

Our experience parallels in no wise that of the man with many case records, except in one particular, our interest in extending the indications for transfusion. We have seen benefit follow its use in cases of infection (organism determined or undetermined) in cases of blood dyscrasia (purpura, persistent bleeding of unknown origin) in bronchopneumonia and in cases of eclampsia and in nephritis, and it is because of these benefits that this paper is presented.

As far as sepsis cases are concerned, it has been suggested that blood be used which has been made antibacterial by the injection of vaccines made from the patient's infectious process, the idea being the same as that prompting physicians to use convalescent influenza-pneumonia serum in influenzal pneumonia. We have not made use of this suggestion but have employed normal typed blood. The effect of the blood in sepsis is to lessen the anemia, to supply active leucocytes, to raise blood pressure and by all three to add to the natural defenses of the patient. The real value is from stimulation of the tissues to increased cell proliferation, and according to Polak, this is obtained not from the quantity but rather from early and repeated small infusions which enable the patient to immunize himself. The use of 250 to 300 c. c. every third day is recommended.

In blood dyscrasias with evidences of deficient clot forming constituents in the blood, large amounts seem advisable. The frequency of injection depends upon the clinical course of the disease, but one large transfusion may suffice.

In nephritis we have used it a few times; in acute cases with some temporary benefit, and in chronic cases with secondary anemia, with marked improvement in the blood picture and resulting benefit to the patient.

In bronchopneumonia we have employed transfusion with the greatest benefit and shall in the future recognize its potentiality and call upon it for assistance in these cases for which otherwise we have done so little.

We have seen no harm follow transfusion and in the experience of one of us (S) reactions after citrated blood have been infrequent and of slight degree. The grouping has been done with the extremest care by Dr. Eiman, of the Presbyterian Hospital, and no Group IV has been used unless the donor and recipient both belong to this group, and then cross agglutination is practised. It has been suggested that the low percentage of reactions may in a measure be ascribed to this.

An advantage of the citrate method in purely medical cases such as nephritis, bronchopneumonia, and certain types of sepsis is that the donor's blood can be collected out of the patient's sight, can be carried to his bedside, and there given with no more shock to the sensibilities than that accompanying an ordinary vein puncture.

Sulphemoglobinemia.—V. R. Mason and F. D. Conroy (*Bulletin of the Johns Hopkins Hospital*, December, 1921) report a case of sulphemoglobinemia, which is the thirteenth proved instance of this condition on record. After describing the patient's history, they discuss the clinical features of this condition, the diagnosis, pathogenesis, and treatment.

Read before the American Therapeutic Society, May 2, 1922.

Alcohol Injection in Facial Neuralgia.—Wilfred Harris (*Lancet,* July 15, 1922) states that concentrated alcohol coagulates the albuminous elements of the nerve fibres and dissolves the fatty sheath of Schwann. Degeneration downward of the nerve then results from the point of injection (neurolysis). The regeneration of the nerve fibres takes place as usual and may be more or less complete in two years. In the author's experience, the sensation never returns so fully in the third division of the nerve as it does after injection of the second division. If the nerve is properly injected, the freedom from neuralgia may be practically guaranteed for twelve months, and in the majority of the author's cases it lasted much longer, ranging up to thirteen years in one case of involvement of the third division; the usual period is four to five years. In many scores of cases in which the author injected the Gasserian ganglion with a resulting total anesthesia, the author sees no reason why the cure may not be as permanent as with complete gasserectomy or resection of the sensory root behind the ganglion, although the injection treatment is infinitely less severe a procedure and is practically free from risk when done by an expert. Nevertheless, it is not an operation to be attempted until considerable experience has been gained with this treatment.

Modern Treatment of Tabes and Paresis.—E. Mattauschek (*Wiener klinische Wochenschrift,* August 3, 1922) states that in every fresh case of tabes, regardless of the stage of the disease, the specific therapy should be a combined mercury arsphenamine course of treatment; if crises or severe pains appear during the course of treatment the mercury can be omitted temporarily and the dose of the arsphenamine can be reduced. During or after the second half of the treatment, iodine should be given in daily doses of two to five gm. If the treatment is successful, it should be repeated within a year; in stationary rudimentary cases, and in those with single objective symptoms, the repetition of the course may be delayed longer. With insufficient and transient improvement, the treatment should be repeated after six months, combined possibly with the nonspecific remedies, such as tuberculin, typhoid vaccine, the treatment for malaria or recurrent fever and sodium nucleinate. In torpid cases with insufficient and inadequate reactions of the spinal fluid, such a combined treatment should be tried in the very beginning. In severe acute ataxia, only arsphenamine and iodine are indicated. For very advanced cases, arsphenamine alone, or combined with roborants and symptomatic treatment, is indicated.

The general treatment consists of measures to maintain and increase the patient's strength, the avoidance of cold water treatments and the use of thermal baths and the baths and water drinking at Hall, Gastein, and Teplitz. For pains, antineuralgic remedies, especially pyramidon, moist packs, hot air, saline baths, d'Arsonvalization, high frequency and diathermy and in obstinate cases, radium emanation are indicated. In the most intense, obstinate and obstreperous cases, surgical procedures are indicated. If the pains are localized in definite root areas, the injection of 0.5 per cent. novocaine adrenaline solution into the sites of exit of the nerve roots may be tried. The surgical treatment also includes the intradural or extradural division of the particular posterior roots affected. Gastric crises may require a few drops of cocaine or amyl nitrite, repeated doses of six to ten drops of adrenaline, codeine, belladonna suppositories, morphine and atropine, or lumbar puncture. Morphine sometimes aggravates the condition.

If all of these measures should fail, such surgical measures as stretching of the solar plexus, resection of the splanchnic nerve, gangliectomy, division of the vagus branches at the cardia with subsequent gastroenterostomy, or division of the painful fibres of the anterolateral tracts of the spinal cord at the level of the uppermost dorsal segments, are indicated, but these are all measures of the last resort. To prevent infection of the bladder, it should be emptied at regular intervals. If the bladder is overdistended, manual expression of the urine may be tried before resorting to catheterization. In severe disturbances of bladder function (hypertonic bladder with the formation of trabeculæ) the intravesical division of the sphincter or an excision of a wedge from the posterior commissure of the internal urethral orifice of the urethra has been recommended. The ataxia is treated by reeducation; it is contraindicated, however, in far advanced cachectic cases with severe cardiac and vascular affections and in those with severe joint changes. This treatment should be given methodically and (at least in the beginning) by the physician himself. The hypotonic muscular conditions require orthopedic treatment.

Dibromin, an Improved Surgical Disinfectant.—Francois de Martigny (*Canadian Practitioner,* May, 1922) states that some very interesting and impressive observations were recently made at Hôpital Francais in a study of forty-five septic surgical cases treated with solutions of dibromin. This preparation is a bromine compound. It is a pure, chemical, crystalline substance, colorless and odorless, containing fifty per cent. bromine (debrom-malonyl-ureide). It is rapidly soluble in water and will remain stable in solution for at least a week. The chemical stability of dibromin is an important factor, as it will remain in its original form indefinitely, if put into gelatin capsules and kept dry. In this form the preparation can be conveniently used for making exemporaneous solutions when desired. This feature alone seems to have solved the problem that has always confronted the surgeon who formerly used chlorine compounds. Unpublished reports of laboratory tests show that dibromin is a very active germicide as compared to phenol, acriflavine, and iodine. This is especially true when tested against such pathogenic organisms as Bacillus pyocyaneus, Streptococcus hemolyticus, Staphylococcus aureus, Bacillus diphtheria and pneumococcus. This bromine compound appears to have a selective action on bacteria by reason of the oxidizing effect of the bromine, and at the same time shows little or no effect upon animal tissue. It is also devoid of objectionable properties such as toxicity, odor, instability, and taste. The majority of chemical substances which have been employed as germicides or antiseptics, while effective, unfortunately possess other properties which limit their use on living tissue. Dibromin is comparatively nonirritating when fresh solutions of proper strength are used.

Proceedings of Societies

SOUTHERN MEDICAL ASSOCIATION.

Sixteenth Annual Meeting, Held at Chattanooga, Tenn., November 13 to 16, 1922.

The President, Dr. Seale Harris, of Birmingham, Ala., in the Chair.

(Continued from page 187)

Glucose Tolerance Test in Malignancy of Digestive Tract.—Dr. Sidney K. Simon and Dr. J. Holmes Smith, Jr., of New Orleans, stated that the glucose tolerance test was carried out in forty-five cases. In fifteen the diagnosis of carcinoma was definitely proved; nine, or sixty per cent., of the patients gave a typical high sustained curve. In one case a high but atypical sustained curve was present, yielding a total of sixty-six and two thirds per cent., giving a sustained typical or atypical curve among the cancer patients. One case of pulmonary tuberculosis likewise furnished a type I sustained curve. A new type involving a relatively low percentage of blood sugar at the forty-five minute reading was observed, which was sustained to the end of the two hour period. They did not believe that this type was of significance in the diagnosis of malignancy. While not specific for carcinoma, a certain type of glucose tolerance curve was observed in a majority of patients suffering from carcinoma of the digestive organs. After excluding diabetes mellitus, tuberculosis and hyperthyroidism, the type I or type II curve in conjunction with characteristic clinical evidence would lend strong support to the diagnosis of malignancy.

Diagnosis and Treatment of Tetany.—Dr. Stewart R. Roberts, of Atlanta, Ga., stated that the treatment of tetany called for certain therapeutic indications, which once understood permitted the details to fashion themselves easily. The convulsions and spasms should be stopped, laryngospasm relieved, and the irritability of the nervous system lessened. During the acute attack cow's milk should be withdrawn or greatly diminished and cereals and gruels substituted. In older children and adults the fresh vegetables containing vitamines were in order. A well balanced diet was indicated when possible. Hygienic measures were particularly important. In one case the child improved materially when given abundant fresh air and sunshine. When tetany was associated with another disease which bore a casual relation to it, treatment of the primary disease was essential.

Acute Otitis Media in Children.—Dr. Joseph B. Greene, of Asheville, N. C., emphasized the following points: The difference in the anatomy of the temporal bone and adjacent structures of infants and children from that of adults. Our duty in urging all measures possible for the prevention of middle ear diseases and the importance of instituting prompt and appropriate treatment as soon as symptoms arise. The importance of early incision of the drum membrane without waiting for all the cardinal symptoms and the marked changes in the tympanic membrance, keeping in mind the fact that it was safer to operate a day too early than an hour too late.

Direct Intubation in Neglected and Desperate Cases of Tracheal and Bronchial Diphtheria.—Dr. Clyde E. Purcell, of Paducah, Ky., stated that with direct intubation and bronchoscopy we could practically eliminate tracheotomy in the management of diphtheritic stenoses. Tracheotomized patients required very skilled nursing. However, intubation cases with ordinary nursing were not such a problem. It must not be understood that this was a panacea for diphtheric stenotic complications. If a patient had no lung complication, no kidney involvement, and was not profoundly septic from absorption of toxins, the two means we had at hand, together with massive doses of antitoxin, ought to save a great majority of these patients. So far, he said he had been able to save every one.

Eye Lesions of Nasal Origin.—Dr. Joseph D. Heitger, of Louisville, Ky., said that in all eye lesions, regardless of possible etiology, one must be ever mindful of the nasal sinuses as a possible etiology. Repeated careful examinations with proper illumination were often necessary to disclose small easily overlooked changes in the postethmosphenoidal district which might be productive of ocular lesions. Sluder's careful clinical description, coupled with Wright's histopathological diagnoses based on Sluder's specimens removed at operation offered the most practical approach to the study of eye lesions of nasal origin. Early differential diagnosis and complete operation when treatment failed to produce rapid results were of great importance in the prognosis of ocular lesions of nasal origin. More qualified use of the word pressure was needed in the literature dealing with eye lesions of nasal origin. Closer intensive group study was necessary if progress was to continue.

Clinical Observations Following the Use of Cyanide of Mercury in Lenticular Opacities.—Dr. John H. Burleson, of San Antonio, Texas, said that all cases injected the patients showed improvement; those with metabolic disturbance relapsed. All cases traceable to infection had apparently been benefited. Twenty cases showing opacities of the crystalline lens had been studied to determine the relation of the blood sugar to etiology. Seventeen of the twenty cases showed an increased blood sugar percentage. The lowest blood sugar was 1.24 gm. to the litre; the highest was 3.00 gm. to the litre. Graded glucose tolerance tests in three of these cases showed blood sugar curves similar to those found in early diabetes.

The Problem of Obscure Nose and Throat Affections.—Dr. Edward A. Looper, of Baltimore, Md., said it was important to recognize focal infections in the upper respiratory tract at the earliest possible time, before toxic absorption had produced permanent degenerative changes. As many of these cases were difficult to determine because of indefinite local pathology, we must be governed in our final opinion by a careful study of the general symptoms and the reaction in remote structures. For this reason a careful history was necessary. Complete physical examinations were important. Investigation of eye symptoms and changes in other organs might lead to the development of factors which proved to be the deciding element in a final analysis of the case.

Surgical Treatment of Diseases of the Gallbladder.—Dr. Irvin Abell, of Louisville, Ky., stated that eighteen of the 411 cholecystectomies in his series had previous cholecystostomies. Some of these had been done for cholecystitis without stones; most of them for cholecystitis with stones. In three of the patients primarily operated on by him the stone formation existing at the second operation greatly exceeded that found at the first operation. Of sixty-six patients operated on for common duct stone, seven had a previous cholecystectomy. The great variation in the pathological anatomy afforded by the size, number and distribution of the stones, and the degree and extent of the inflammatory edema and infiltration contributed greatly to the difficulty of making a complete removal. In 394 cases the stones were found in the gallbladder in 339, the common duct in thirty-one, the hepatic duct in one, and the entire tract in twenty-three.

Gallbladder Disease.—Dr. Martin E. Rehfuss, of Philadelphia, Pa., stated that one ought always to be on guard for possible associated disease of which most common were chronic appendicitis, chronic colitis, and chronic lesions of the stomach and duodenum. It was his rule to urge operation when medical treatment failed to produce amelioration of symptoms and failed to produce a cessation of the acute attack. He urged operation when there were gross deformities in the upper right quadrant, usually demonstrable by the x ray, and in the presence of acute inflammatory diseases under precisely the same condition that one would operate in acute appendicitis. In the presence of common duct block, or in the presence of chronic gallbladder disease at the malignancy age, when the patient failed to register any improvement, after an appreciable period of medical treatment, the physician was warranted in attempting surgery.

Socalled Perthe's Disease.—Dr. F. Walter Carruthers, of Little Rock, Ark., stated that the clinical picture presented was of a child usually between the ages of six and eight or older, with a history of a fall four or six months previous, now limping, and complaining of one leg tiring easily. There was a slight deformity at the hip and the child was unable to bring the leg inward without some pain and especially on marked abduction the pain was severe. Flexion and extension were apparently normal, and there was possibly a little shortening of the limb. Bryant's triangle showed and the condition was unilateral. Treatment should consist in relief of weight bearing, whether by rest in bed or by some mechanical appliance, regardless of the fact that this condition was considered a self-limiting disease of two or three years.

Clinical Aspects of Botulism.—Dr. J. C. Geiger, of Chicago, Ill., stated that there was considerable variation as to the susceptibility of guineapigs to botulinus intoxication with spores. There was a considerable difference of results in animals inoculated subcutaneously and fed with spores. Unquestionably spores might remain latent in tissues of animals for many weeks without the animal showing any indication of the disease. It was comparatively easy to isolate the spores of Bacillus botulinus from practically every tissue of the body after feeding or subcutaneous inoculation of the spores. There might be a quantitative relationship both of the feeding and subcutaneous inoculation as to the number of spores. Epidemiological and experimental evidence seemed conclusive that Type A was predominant in outbreaks among human beings in America, and was probably the more toxic.

Arthroplasty.—Dr. Frank D. Dickson, of Kansas City, Mo., said that cases of arthroplasty should be carefully selected. An adequate incision should be used so that a good exposure might be secured. Sufficient bone should be removed to allow free motion. In the aftertreatment, the use of traction with early movement gave the most satisfactory results. The earlier the voluntary control of the joint was established, the better the range of motion.

Tendon Transplantation.—Dr. Wyatt S. Roberts, of Birmingham, Ala., said that tendon transplantation was a brilliant contribution to the surgery of paralytic deformities. Much of the experimentation of the earlier years had given way to conservatism. Procedures of known worth should, as a rule, be employed and perfected by more careful selection of cases, by improvement of the operative technic, and more thoroughly supervised aftertreatment. These points should be remembered and practised in each case.

Fractures of the Neck of the Femur.—Dr. Duncan Eve, of Nashville, Tenn., said that operative treatment of fractures of the femoral neck was not very popular and should only be undertaken in young and middleaged persons, in whom retention in correct position seemed impossible. If an open operation was decided upon a fluoroscopic examination should be made to determine that extension and abduction had succeeded in bringing the fragments in apposition. A small incision should then be made through the skin over the external aspect of the great trochanter, and usually an eight or ten penny nail driven through the trochanter and neck into the head for fixation. A plaster of Paris cast was then applied with a trapdoor cut out over the site of the incision. An ivory peg, instead of a nail might be used, in which case the trochanter and neck were drilled before the peg was placed. In ununited fractures of the neck of the femur, autogenous bone grafts promised the best results, if the patient was physically able to undergo the operative procedure and subsequent confinement. The operation should never be performed on a very old person.

Intestinal Obstruction.—Dr. T. W. Holmes, of Winona, Miss., stated that since the mortality was in direct ratio to the time of onset to the time of operation, early operation was to be urged. Each late case was a problem unto itself and called for keen surgical judgment. The anesthetic should be nitrous oxide oxygen, or local anesthesia might be employed. The toxemia should be combatted and neutralized by fluids in abundance, hypodermoclysis, gastric lavage, etc. Carbohydrates should be administered and proteins avoided.

(*To be concluded.*)

Abstracts from Current Literature

GASTROENTEROLOGY.

New Culture Medium for Intestinal Flora.—D. Chalmers Watson (*Lancet,* July 15, 1922) proposes a saccharose milk agar medium. The broth (using bullock's heart) is made as follows: Meat extract, 1000 c. c.; peptone 10 gm.; sodium chloride 5 gm. This mixture is evaporated down to one fifth original bulk and then made up to the original bulk with whole milk; two per cent. saccharose is added after the medium has been neutralized with tenth normal sodium hydroxide solution. With the use of this medium it was found that in contrast to all the other media commonly used for primary culture, the growth of gram positive organisms, mainly of the streptococcal forms, increases from an average of five per cent. or less up to an average of forty-five or fifty per cent. With this medium a film is obtained which compares favorably with the original smear and while favoring the growth of streptococci it does not inhibit the growth of coliform organisms. The vaccines are usually prepared from the organisms which grow on the media in common use, and the author believes that the cause of the profound derangement of the normal flora is to be found in the relation to the bacteria which do not readily grow on the ordinary media, but are revealed by the use of this new medium. The possible significance of variations in the hydrogen ion concentration of the media should not be overlooked. Further investigations along these lines is necessary.

A Case of Hyperplastic Variety of Intestinal Tuberculosis.—S. R. Klein (*Western Medical Times,* July, 1922) refers to a rare form of intestinal tuberculosis associated with a markedly thickened intestinal wall the result of the formation of tubercles in the mucosa and muscularis. The mucosa may show only atrophy and little or no caseation. It usually affects the ileocecal region and involves any intestinal coils adherent to the primary lesion. There may be strictures of the intestines at intervals with normal or less advanced stages of the disease in the intervening portions. Near the constrictions the peritoneum is usually studded with pedunculated masses of tubercles and the neighboring mesentery is thickened and infiltrated with tuberculous granulation tissue. The corresponding mesenteric glands are tuberculous. Polypoid tuberculous masses may project into the lumen of the bowel; these may be covered with normal or atrophic mucosa, but they rarely ulcerate. In some cases there are no typical tubercles but the tissues are infiltrated with round cells without epithelioid cells or caseation, although many tubercle bacilli can be found between the cells of the infiltration. This condition is usually primary and rarely associated with pulmonary disease; its slow development and its peculiar pathology point to an infection with a strain of tubercle bacillus of low virulence. The symptoms are often vague. Diarrhea and constipation may alternate or either one may be predominant. Colicky pains, transient and slight or severe and persistent, may occur in the lower part of the abdomen, accompanied by nausea and vomiting. Thirst may be marked. Tubercle bacilli are found in the stools and in the more advanced cases chronic diarrhea is usually present. The prognosis is very good. A case is reported in which the patient could retain nothing in his stomach and vomited immediately after taking food. He was treated with boiled milk and lime water. He is still alive after six years, constantly gaining in weight and improving his general condition.

Effect of Saline Purgatives on the Absorption of Other Drugs.—D. I. Macht and E. M. Finesilver (*Bulletin of the Johns Hopkins Hospital,* September, 1922) describe experiments which show that saline purgatives markedly affect the absorption and consequent excretion of other drugs. All the drugs used in this study were markedly delayed in their absorption from the stomach and intestines when they were administered subsequently to or even simultaneously with saline laxatives. The drugs studied were phenolsulphonephthalein, chloretone, apomorphine, morphine, pantopon, cocaine, strychnine, atropine, digitalis, convallaria, sodium salicylate, salol, aspirin, antipyrine, lactophenin, potassium iodide, hexamethylenamin, phenol and bichloride of mercury. The absorption and subsequent secretion of phenolsulphonephthalein and sodium salicylate were markedly affected by saline purgatives, even when the former drugs were given by intramuscular or intraperitoneal injection. No important effect on the absorption of the drugs from the stomach and intestines was exerted by laxatives other than those of the saline type. The results reported have an important practical bearing on the therapeutic administration of medicaments. The experiments, particularly those with phenol and mercuric chloride, speak in favor of a more extensive employment of saline laxatives in toxicological cases.

The Use of the Van den Bergh Test in the Differentiation of the Obstructive from Other Types of Jaundice.—J. W. McNee (*British Medical Journal,* May 6, 1922) found that the chief clinical value of this test is that with it jaundice due to obstruction of the main bile ducts by carcinoma, hepatic cirrhosis, obstruction in the portal fissure or gallstone in the common bile duct can be clearly differentiated from jaundice of hemolytic origin or from functional derangement of the liver cells, as hemolytic and alcoholic jaundice and functional jaundice, such as catarrhal jaundice, toxic jaundice of infective diseases (typhoid fever and pneumonia), and icterus neonatorum.

It consists of Ehrlich's diazo reaction applied to the blood serum: To one c. c. of the serum in a small test tube 0.25 c. c. of freshly prepared diazo reagent is added. One of three events may follow: 1. An immediate reaction in ten to thirty seconds, showing a bluish violet color, the intensity depending upon the amount of bilirubin present. 2. A delayed reaction after one to fifteen minutes or longer, showing a reddish color which gradually deepens and becomes more violet. This has been replaced by the indirect reaction. 3. A biphasic reaction after ten to thirty seconds, showing a slight reddish color, which after one minute or longer gradually deepens and becomes more violet. The immediate or direct reaction denotes obstructive jaundice. If this is not obtained, add two c. c. of a ninety-six per cent. alcohol to one c. c. serum, the mixture is centrifuged to precipitate the albumin. To one c. c. of the supernatant fluid add 0.5 c. c. alcohol and 0.25 c. c. diazo reagent: if bilirubin is present in the fluid a maximal violet red color obtains at once. Where a perfect indirect reaction results, the jaundice is either hemolytic or due to some functional liver cell derangement without obstruction.

The mechanism of this test depends upon the fact that where bilirubin gives only the indirect test, the pigment is bound to the albuminoid substances in the serum and the union is only broken by time or alcoholic precipitation. The bilirubin differs molecularly in the two conditions. The biphasic reaction depends upon the presence of both types of bilirubin in different proportions in the same serum. The biphasic test should, at present, not be used to draw absolute conclusions. The author found it present in uncompensated chronic valvular disease, the icterus at first being functional in nature and later of the obstructive type, corresponding to the degree of hepatic engorgement. In cases of suspected carcinoma of the liver or the exit of a calculus from the common bile duct, it is important to estimate the increase or decrease of the bile pigment in the serum, especially in obstructive jaundice and in the latent jaundice of pernicious anemia. The indirect test can also be used for colorimetric quantitative determinations of bilirubin.

Etiological Relationship of Gallstones to Cancer of the Gallbladder.—In an extensive study, Ludwig v. Aldor (*Wiener klinische Wochenschrift,* May 25, 1922) arrives at the following conclusions: 1. The opinion usually held that gallstones are in etiological relationship to cancer is untenable because it is based on the onesided, frequent coincidence of cancer and calculus. 2. This belief does not take cognizance of the fact that very often calculi are not associated with cancer. 3. The easily demonstrable disparity in the frequency of cancer and calculus speaks against an etiological relationship. 4. The systematic pathological investigations of Aschoff and Backmeister do not justify the assumption of a relationship. 5. Symptoms referable to cholelithiasis are usually not obtainable in the histories of cases of cancer of the gallbladder. Yearly observations of 360 cases of cholelithiasis over long periods of time showed that although the cholelithiasis existed in sixty-four per cent. of the cases for one to ten years and in thirty-six per cent. of the cases for ten to forty years, nevertheless the clinical picture did not warrant the assumption in a single case that the calculous process underwent transition into a cancerous one. 6. If there were positive proof for the assumption of an etiological relationship between calculus and cancer of the gallbladder, not only would there be a greater justification for an early operation, but it would also have to be remembered that in every laparotomy the gallbladder should also be examined and any calculi removed. As this etiological relationship is not demonstrable, it is not justifiable to frighten patients suffering from gallstone with the possibility of cancer in the future.

OBSTETRICS.

Pernicious Vomiting of Pregnancy.—Carlton Oldfield (*British Medical Journal,* May 20, 1922) believes that all cases of pernicious vomiting are neurotic in origin and treats them accordingly. In a series of twenty-nine cases all the patients recovered and abortion was induced in only one case. The patient is admitted to a hospital and put on an ordinary diet at once. The attending nurse is told to consider the case one of neurosis, that a bowl must not be provided even if vomiting occurs, and that the words vomit and sickness must not be mentioned in the sickroom. The patient must be expected to take her food just like other patients and must not be persuaded to do so. Usually the patient will take the ordinary diet at once, part of which may be vomited occasionally, when the patient should be assured that the vomiting will soon stop. A rectal infusion of four per cent. glucose solution is usually given continuously by the drop method for the purpose of relieving thirst and exhaustion and also to diminish the acidosis. No drugs except purgatives (when necessary) are given. These patients do better in a ward than in a private room and under the direct observation of the obstetrical surgeon. The author considers toxemia the result, not the cause, of vomiting.

Treatment of Severe Vomiting of Pregnancy.—J. A. Gabastou (*Semana Medica de Buenos Aires*), after advising several other measures, often found of service for the relief of this condition, refers to the necessity of reducing the blood pressure, which is always high. This tension, he says, is to be charged to the glands of internal secretion. It is easy to see how the corpus luteum may be the inciting cause by a gradual weakening, as pregnancy progresses, of its defensive power against the autotoxemia of that condition. The suprarenal glands, whose normal and pathological action in pregnancy is well established, may, by a recognized effect of insufficiency or hypoadrenalism consequent upon the increased task imposed by the gravid state, take part in bringing on vomiting of a severity proportional to their development. Administration of these extracts then is among the measures to be taken in overcoming the toxin whose presence is the occasion of the vomiting.

A Case of Vagitus Uterinus.—Th. Johannsen (*Zentralblatt für Gynäkologie,* June 24, 1922) believes that vagitus uterinus occurs in patients who are delivered instrumentally. He reports a case in which a forceps had to be applied because the head would not enter the pelvis; the cervix was rigid. During the forceps delivery the author, bystanders, and the patient heard a distinct cry of the child. The cord was found wound twice around the child's neck and it therefore must have been very tense and constricted as a result of the forceps delivery. It is difficult to determine how much the infantile cry was due to external stimulation (the application of forceps), but if that were the case vagitus uterinus ought to occur more frequently. The child could not have breathed deeply, as the delivery took place some time after the cry and the child, in spite of the double encircling of the neck by the cord, was not asphyxiated and cried lustily after delivery.

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SURGERY.

Radical Cure of Inguinal Hernia.—R. V. Slattery (*Irish Journal of Medical Science,* November, 1922) presents the following operation, which he believes to be superior to others. The Trendelenburg position facilitates the operation, and, where possible, should be adopted. 1. The external oblique aponeurosis is exposed as in Bassini's operation. Before dividing it the anterior aspect of Poupart's ligament is exposed. 2. The external oblique is incised from the external ring to slightly beyond the internal ring. 3. The sac is freed from the surrounding fasciæ and cord starting at the internal abdominal ring. If small, the sac is ligated and removed; if large, or very adherent, the sac is ligated at the internal ring, and divided; the lower end is left. 4. The cord is freed from its bed, and retracted upwards, exposing the fascial floor of the inguinal canal. 5. The fascial floor of the inguinal canal is incised midway between Poupart's ligament and the structures of the conjoined tendon, care being taken not to damage the deep epigastric vessels. This incision is carried into the enlarged internal abdominal ring. It is essential to divide thoroughly the fascia transversalis. This is accomplished when the retroperitoneal fatty tissue is reached, which, when the patient is in the Trendelenburg position, will fall away from the fascia transversalis bringing with it the deep epigastric vessels. 6. The fascia transversalis is freed gently from the retroperitoneal fatty tissue, both upwards under the conjoined tendon, and downwards to expose the deep aspect of Poupart's ligament. 7. The fleshy arch of the internal oblique muscle is retracted upwards, and tissue forceps are applied to the divided fascia transversalis beneath it. This fascia is drawn into the wound, and it brings with it the lower aponeurotic portion of the transversalis muscle. The lower flap of the transversalis fascia is drawn forwards with Poupart's ligament. 8. Mattress sutures—four generally suffice—are used to approximate the fused fascia and aponeurosis to the deep aspect of Poupart's ligament, the innermost suture being introduced first. The aim of this suture is to unite the lower tendinous border of the transversalis muscle with its attached transversalis fascia to Poupart's ligament. The next suture also unites to Poupart the fused tendinous lower border of the transversalis muscle and fascia. The two outer sutures unite strong fascia transversalis to Poupart's ligament. These sutures should be passed deep to the lower flap of the transversalis fascia, as it is important that this should not intervene between Poupart's ligament and the structures to be united to it. By carefully drawing Poupart's ligament forward, and passing the needle from within outward to emerge where Poupart's ligament blends with the fascia lata of the thigh, these sutures are easily and safely introduced. When tying the mattress suture nearest the internal abdominal ring, care must be taken not to narrow that ring unduly. When these sutures are tied it will be seen that the internal oblique, as well as the transversalis muscle, are closely approximated to Poupart's ligament, and that there is a sound floor to the inguinal canal. 9. The cord is allowed to fall back into its bed. 10. The external oblique aponeurosis is stitched up, and the wound closed. The main advantages of this operation are: 1. The normal anatomical structure of the inguinal canal is not altered; the distance between the internal abdominal ring and the external is not diminished. The internal abdominal ring lies under the supporting muscular fibres of the internal oblique. 2. There is freedom from pressure on the cord with thorough repair of the internal abdominal ring, as the structures of the cord in that region are of very small bulk. 3. Convalescence is rapid. 4. The operation is applicable to all oblique and direct hernias.

Late Treatment of Fractures of the Long Bones of the Lower Extremity.—John T. O'Ferrall (*New Orleans Medical and Surgical Journal,* October, 1922) makes the following points: Fractures when properly reduced have sufficient union soon thereafter to permit function of adjacent joints. This joint function should be begun within a period of three weeks and is imperative. Continuous splinting without observation and joint function is condemned. Callus in the repair of bones begins to form at once but is not sufficiently hard to permit weight bearing without protection for a period of from four to six months. The function of joints adjacent to fractures is better accomplished by active motion carefully done than by passive motion. Protection of fractures of the lower extremity, at the same time permitting walking, is best done by means of the caliper splint which transfers the weight to the pelvis. The proper measurements for a caliper splint are extremely simple and should be familiar to all engaged in fracture work.

Chronic Arthritis.—L. T. Swain (*Journal of Bone and Joint Surgery,* July, 1922) concludes that there are three distinct types of arthritis: infectious, atrophic, and hypertrophic. These types differ etiologically, pathologically, and clinically, and in x rays. They respond to treatment differently and should, therefore, be differentiated. Clinical data seem valueless unless these types are studied as separate pathological entities.

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Clinical Errors in the Diagnosis of Acute Contagious Diseases*

By HARRY R. LITCHFIELD, M.D.,
and LEON H. DEMBO M.D.,
New York.

How encouraging it must be to the vast army of research workers to think of the day when all contagious diseases will be controlled. Little did Von Behring, a quarter of a century ago, realize that he had laid the foundation for the control of another of the contagious diseases by the introduction of active human immunization against diphtheria by means of toxin antitoxin. Even that most dreaded contagion, scarlet fever, in its severest form, is beginning to show a lessened mortality wherever convalescent human blood serum, originally introduced by Weissbecker in 1896, is used. Where our tireless workers in that fascinating field of research have failed to provide serums, vaccines, or other means to combat disease, clinicians and public health experts, with their modern methods for disease prevention, are gradually making conditions so uncomfortable for the activities of the microbe as a pathogenic agent, that, were correct diagnoses more frequently made, their labors would be sufficiently rewarded.

From the large number of cases coming under observation at this hospital, we have been able to note many atypical syndromes and peculiarities in the character and distribution of rashes, which are responsible, to a great degree, for many errors in diagnosis by those unacquainted with the clinical pranks often played by these diseases.

There is usually considerable difficulty attending the diagnosis of the exanthemata in their prodromal stages. The general demand upon the physician for an exact diagnosis of every case before its complete evolution, is founded on an erroneous conception, and the sooner this is recognized, the better for all concerned. Few cases, when seen early, are so urgent that we cannot wait a few hours at least either to verify or to remove our suspicions. In the best interest of the patient it is wise to withhold an absolute opinion until sufficient evidence appears to warrant a reasonably certain diagnosis. Again, in view of the necessary observance of quarantine regulations, we must not jump too quickly at conclusions, but must consider carefully the facts relative to the character of the onset and the clinical picture before us.

In presenting the case reports with points illustrative of the atypical clinical features forming the basis for frequent diagnostic errors, we shall supplement discussions of the differential diagnosis of the individual diseases with descriptions of the more common typical cases.

MEASLES.

Concerning measles, with all our recently acquired knowledge of diagnostic methods, signs, spots and clinical pictures, it should not be difficult to establish a diagnosis in frank cases, but where variations in the usual clinical syndromes are encountered, our difficulties begin. To the usual clinical description of this disease we can add little; but before going into the variety of common mistakes met with in diagnostic work, a few points for comparison may be discussed here to advantage.

The onset, in the vast number of cases seen at this institution, is with what we term the triple C complex: coryza, conjunctivitis and cough. The coryza is usually moderate, the conjunctivitis simple and the cough slight. The buccal mucous membrane is inflamed and studded with small, raised, pin point, pearly white spots. These spots—Koplik's spots—may also be found on the mucous membrane in the region of the lower lip, and occasionally may be seen on the congested caruncle at the inner canthus of the eye. These appear from two to three days before the morbilliform eruption. The combination of symptoms and signs just described constitute the essential basis for a diagnosis. In association with these may be mentioned photophobia, sore throat, fever ranging from 102 to 104 degrees, headache and not infrequently diarrhea. The rash usually appears within three to four days of the onset of the disease. It is characterized at first by small macules, of a pale red color, irregular in shape, and appearing first behind the ears, at the hair line, on the forehead,

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cheeks and temples. These rapidly spread to the neck, chest, trunk and extremities, soon assuming a papular character and rapidly coalescing to form the socalled crescentic eruption. The rash, at its height, is of a dark red, blotchy appearance, and within twenty-four hours the evolution is complete. The fever usually reaches its maximum at the height of the rash. Coincident with the full development of the eruption, the respiratory symptoms are intensified. The eyes secrete freely, the cough becomes worse, diffuse coarse and fine râles can be heard in the chest, the superficial lymphatic glands are enlarged, and there is great restlessness and irritability. In the uncomplicated cases the rash begins to fade on the second or third day of the eruptive period, with a simultaneous decline of the temperature and an abatement of all symptoms. On the seventh or eighth day there is a fine, branny desquamation. This last is by no means constant.

We shall forego a discussion of the differential diagnosis, since our case reports, besides illustrating some common mistakes in the interpretation of symptoms, will emphasize certain differential points. The following case, while fortunately not an example of a common error, nevertheless illustrates well the wide range of error made possible by careless examinations and partial ignorance of the usual symptoms and signs associated with this disease.

Case I.—A four year old boy was admitted to a children's hospital, having been sent in by a physician who had made a diagnosis of typhoid fever. The child had a moderate nasal discharge, edema of the conjunctivæ, especially of the lower lids, a slight cough, and a moderately congested throat. The temperature was elevated to 102 degrees and a casual examination of the buccal mucous membrane revealed typical Koplik's spots. The skin was negative regarding eruptions. A diagnosis of measles was immediately made, and the child placed in isolation. The doctor who had referred the case was insistent that the prevailing condition was typhoid fever, arguing that the spots on the mucous membrane were those of an herpetic stomatitis. The following day Widal test and blood culture were reported negative, and within twenty-four hours a typical maculopapular eruption appeared, reaching its maximum twelve hours later. The diagnosis of measles was then conceded.

The fever and respiratory symptoms presented might have led one to be suspicious of the prodromes of a typhoid invasion. The presence of the spots on a greatly inflamed mucous membrane, in association with the coryza, conjunctivitis and cough, should at once have disclosed the nature of the disease. As to the possibility of these spots being an herpetic stomatitis, a more careful observation would have ruled this out as a factor in the diagnosis. The lesions in this type of stomatitis are characterized by small, yellowish, discrete areas surrounded by zones of hyperemia. Occasionally they become confluent, giving the appearance of placques. These appear in successive crops, the favorite site being the inner surface of the lips, although they may occur in any part of the oral cavity. The resemblance to Koplik's spots, if any, is slight, and a careful survey makes a differentiation easy.

Conversely, it is not uncommon to meet with cases which have been diagnosed as measles because of the presence of what appear to be Koplik's spots. These pseudo Koplik spots occur commonly in a condition known as Fordyce's disease, recently described by Regan (1) as a not infrequent cause of mistakes in the diagnosis of measles. This is described as a chronic disease of the mouth and lips characterized by the presence of whitish or yellowish, scanty or abundant, discrete bodies, often coalescent, occurring most frequently on the inside of the mouth, laterally along the line of teeth as far back as the last molar, and less frequently on the inner surface of the lips. The lesions are pinpoint to pinhead in size and of an oatmeal color. They are almost invariably imperceptible to touch, situated on a level with the buccal mucosa, and occasionally have hairy projections. The disease is common between the ages of twenty and forty years, but has been observed in young children. The exact etiology is not definitely known apparently. Fordyce considered it the result of a granular change in the protoplasm of the cells of the affected mucosa. Regan further states that well marked cases of this disease are unusual in very young children, but that slightly marked cases are frequently seen even in infancy. The following case illustrates an error in the differentiation of this condition from rubeola:

Case II.—An infant of eighteen months was seen in the admitting room, having been sent in with a diagnosis of measles. Examination revealed a greatly undernourished child with an extensive dermatitis involving portions of the scalp and face. The oral mucosa, the lips, and the buccal mucous membrane were studded with these pseudo Koplik spots. There was no fever, respiratory symptoms were lacking, and there was no morbilliform eruption. These small, yellowish white areas did not conform in any way to the characteristic Koplik's spots seen in measles. A diagnosis of Fordyce's disease was made and the case referred to the pediatric department of an adjacent hospital.

Mistakes in diagnosis frequently arise as a result of a hurried examination of an existing rash without regard to its character and distribution. It would seem, from cases which we have observed, that there is a tendency on the part of many to regard almost any rash of a suggestive nature as indicative of the acute exanthemata. While it is true that the eruption is a strong feature in these cases, yet there are so many other factors involved as causes for similar types of rashes, that the history and clinical symptoms and signs warrant a more careful consideration before random conclusions are drawn.

An important clinical variation from the usual type of onset of measles often leads to errors in diagnosis. We refer to acute spasmodic laryngitis as an early symptom, the occurrence of which has many times brought cases of measles to the diphtheria pavilion with a diagnosis of laryngeal diphtheria. The laryngeal stridor in most instances is so marked as to make one strongly suspicious that a true diphtheritic croup is the underlying condition, and in the absence of a rash this view is further strengthened. A close inspection of the buccal mucous membrane, however, invariably reveals Koplik's spots. We are speaking now of the early stage, not of a croup as a complication in the later stages.

In the absence of characteristic Koplik's spots, by far the best method for absolute verification is a direct laryngoscopic examination, to note the presence or absence of membrane. The following case further emphasizes this point:

CASE III.—J. L., a white female child of three and a half years had had fever all day, but played about until bedtime. Shortly after midnight she awoke and coughed several times. The mother described this cough as dry and hard, and stated further that about an hour later the child breathed with difficulty. A physician saw her about three hours later and made a diagnosis of laryngeal diphtheria. Upon admission she was moderately cyanosed and a fairly well marked inspiratory dyspnea was noted. Retractions were moderate, she was very restless, and it appeared that she might very soon require intubation. However, after watching her for a few minutes, the respirations seemed to be less difficult, her color improved, and she seemed more comfortable. Physical examination at this time revealed a simple conjunctivitis, moderate nasal discharge, and an inflamed buccal mucosa. There were no Koplik's spots visible at this time. The throat was congested but there was no exudate. The cervical glands were moderately enlarged. There was no skin eruption. Laryngoscopic examination showed a moderate congestion of the aryepiglottic folds and the vocal cords, but no membrane in the larynx. Measles was suspected and the child was accordingly placed in isolation. Subsequent examination on the following day brought to light typical Koplik's spots, and two days later a well developed rash.

There are several clinical features which characterize laryngeal diphtheria. The onset is usually slow, and the stridor increases progressively without intermission. The respiratory difficulty is both inspiratory and expiratory. In acute spasmodic laryngitis the onset is sudden, usually preceded by moderate cough and hoarseness. The child awakens suddenly, as in the case just cited, with a barking, metallic cough, and a noisy stenotic inspiration. The face is cyanotic, there is marked inspiratory retraction, and moderate prostration. The dyspnea, however, is not progressive, but instead there are intervals during which the severity of the spasm diminishes. The entire attack is short in duration, and constitutional symptoms are very slight.

DIPHTHERIA.

Mistakes in the diagnosis of this disease are perhaps more frequently made than in any of the other contagious diseases. There are, of course, many factors which enter into the sphere of diagnostic error. The throat manifestations are often atypical. There may be just a very small portion of membrane in an early case which is easily overlooked in a hurried and careless examination, or, in many instances, because of poor light at the time of inspection of the throat. Again, many cases at the onset are characterized by small follicular patches on the tonsils, having an appearance similar to follicular tonsillitis. Later these coalesce to form a typical membrane, but delay in the administration of antitoxin in this disease is costly; hence the great importance of early diagnosis. Fortunately, the profession has been educated to the early administration of antitoxin in doubtful cases without waiting for culture reports. Regarding cultures we feel safe in stating that their value lies only as a means of verification. To await reports on throat cultures before instituting the proper tratement is nothing short of folly. The clinical features are far more important, and even when one feels that the picture is incomplete, antitoxin should be injected.

The streptococcic exudate seen in the throat in cases of scarlet fever is not infrequently mistaken for diphtheria exudate, and, unless a careful examination is made for evidences of an existing rash and the associated symptoms and signs, a diagnosis of diphtheria is made. The case here appended illustrates this.

CASE IV.—A colored boy was admitted to the diphtheria pavilion, a diagnosis of pharyngeal diphtheria having been made by an outside physician. The throat revealed a follicular tonsillar exudate, and a moderate amount on the posterior pharyngeal wall. It was of a mucoid character, and the pharynx, pillars, uvula and tonsils were markedly congested and edematous. The inflammatory reaction appeared greater than that usually seen in pharyngeal diphtheria. The boy appeared very ill, the temperature was 103 degrees, and the skin appeared to have an abnormal flush. (This can be seen frequently in colored patients). A careful examination brought to light the characteristic erythematous flush of scarlet fever, rapidly assuming a punctiform appearance. This case was immediately transferred to the scarlet fever pavilion.

In a differential diagnosis under the circumstances just cited, it should be borne in mind that the congested throat in scarlatina is fairly characteristic, being of a dark red color and revealing, upon close inspection, the characteristic enanthem. The inflammation is proportionately much greater than that seen in diphtheria. The exudate is mucoid in character, usually, of a greyish color, and does not assume the features of a membrane. The tongue is also an important diagnostic feature, being of a beefy appearance, with the papillæ raised and prominent, the posterior portion usually coated. The marked rise in temperature and the characteristic rash serve to differentiate further. A history of sudden onset with headache, sore throat and vomiting, in addition to the symptoms and signs enumerated, leaves little doubt as to the prevailing condition. There are, of course, many causes for the production of a scarlatiniform rash other than scarlet fever, which we shall discuss presently.

A not uncommon source of error lies in the syphilitic throat, the associated mucous patches often being mistaken for a diphtheria membrane. The following case is of particular interest in this respect.

CASE V.—J. L., forty years old, white male, was sent in from one of the city hospitals, a diagnosis of diphtheria having been made following an examination of the throat. He had been ill five days, and had been under treatment for lues. The hospital records showed that he had a four plus Wassermann (blood). He had been sent to hospital for an acute exacerbation of a chronic nephritis. Examination in our admitting room revealed characteristic mucous patches at the base of the tongue, both sides of the palate, and extending over the anterior pillars. There was marked peritonsillar edema. The liver was palpable four fingers' breadth below the costal margin. Throat cultures were all negative. Six thousand units of antitoxin were injected intramuscularly, and, although he was under observation for twelve days, there was no change in the throat condition, the patches remaining. He was accordingly transferred to another hospital for specific treatment.

NASAL DIPHTHERIA.

We have confined ourselves, thus far, to a discussion of pharyngeal diphtheria. In nasal diphtheria, while the possibility for diagnostic errors is not as great, one condition must be mentioned which is commonly confused with this form of diphtheria. Congenital syphilis, with the characteristic snuffles, nasal discharge and skin lesions could, in the majority of instances, be correctly diagnosed if the proper amount of time were devoted to eliciting a careful history and to a careful examination. It is the case in which hurried observations are made that finds its way into the diphtheria pavilion. The following case is illustrative:

Case VI.—A male, white child of thirteen months was brought to the admitting room as a case of nasal diphtheria. He had previously been ill for two weeks at another hospital, having been treated for malnutrition. The child was greatly undernourished, had a diffuse skin eruption and a well marked nasal discharge, of a seropurulent character. There was a well marked iritis of both eyes, and there was a characteristic saddle nose. The blood Wassermann was four plus. Nose and throat cultures were negative for Klebs-Loeffler bacilli., and the throat was negative to inspection. The rather characteristic clinical features at once made the diagnosis of congenital syphilis obvious.

LARYNGEAL DIPHTHERIA.

By far the most common error in the diagnosis of this condition in children up to the age of three years is that of confusing it with bronchopneumonia. We have seen innumerable instances in which this mistake has been made. The dyspnea, croupy cough, and retractions in cases of bronchopneumonia in these youngsters, are due in a majority of cases to bronchial and tracheal obstruction by large plugs of mucus. Many times the child may cough up a portion of the mucus, which is mistaken for diphtheritic membrane. An important point to bear in mind in this connection is that these children, when intubated, seldom react well. Instead of a cessation of the dyspnea and retractions and a return of the normal color, the difficulty in breathing persists, due to the fact that the obstruction is low down, past the tip of the tube. When the tube is withdrawn, there is usually a large amount of mucus filling the lumen. Laryngoscopic examination in these cases is usually conclusive.

The signs elicited by auscultation are frequently vague and indefinite. The stridor plays an important part in confusing the examiner, and it is a rather difficult feat to select from the medley of adventitious sounds typical tubular breathing. Where there is a moderate amount of consolidation, percussion is of greater value from the viewpoint of diagnosis. However, it must not be forgotten that bronchopneumonia is a common and early complication of laryngeal diphtheria, and on many occasions we have found it present shortly after the onset of the disease.

Retropharyngeal abscess frequently presents a clinical picture with all the features of laryngeal dipththeria, and we have observed many cases in which this was the prevailing condition, but which had been diagnosed croup. This type of abscess is common in children up to the age of three, and especially in infants under one year. In early cases in which the mass has not attained any considerable size, the respiratory sounds are not characterized by marked stridor, as in laryngeal disease, but are rather of a gurgling type. Respiration through the nose is usually obstructed, the head is thrown back, and there is considerable snoring during sleep. There is usually a rise in temperature, associated with moderate constitutional reaction, such as vomiting, anorexia and not infrequently prostration to a marked degree. An accurate history in these cases is highly important. In cases, however, in which the abscess has developed rapidly the respiratory symptoms are much more marked and may closely simulate diphtheritic croup. The stridor is accentuated, there are well marked retractions of the interspaces, some degree of cyanosis, cough, and well marked constitutional reaction. Palpation of the pharynx will in most cases reveal a mass along the posterolateral wall, projecting forward. Fluctuation may or may not be present, depending upon the stage of development. Occasionally the mass burrows downward so that it may be seen externally on one side of the neck behind and below the angle of the jaw. Incision by means of a bistoury and evacuation results in an almost immediate cessation of respiratory difficulty.

A foreign body in the larynx may present symptoms of a nature similar to laryngeal diphtheria. This is characterized by a sudden attack of paroxysmal cough, dyspnea, hoarseness, and sometimes bloody expectoration, with an absence of fever. The history is of great significance. We mention this condition as an important element in the differential diagnosis. It is, fortunately, not a common error. The differential points of acute spasmodic laryngitis have already been discussed.

Laryngismus stridulus, enlarged thymus, and laryngeal papillomata may present respiratory symptoms simulating croup, and these conditions should be considered in the differential diagnosis, especially in younger infants and children. The characteristic feature of these, however, is the very sudden onset with extremely severe respiratory difficulty. Papillomata, when attaining considerable size, may completely occlude the larynx, giving rise to sudden signs of suffocation. Laryngoscopic examination will reveal the presence of these growths. These latter conditions have not frequently been misdiagnosed, but they serve to emphasize the importance of complete laryngoscopic examination in all cases which are veiled with a curtain of doubt.

The foregoing conditions comprise the possibilities for diagnostic error in the cases of laryngeal diphtheria met with in infants and children. In reverse order, there are several conditions in adults which are frequently misinterpreted and diagnosed croup. Since this is a comparatively rare condition in adults, we are always suspicious when such cases are sent in.

Three conditions are to be borne in mind in this connection, namely, tertiary syphilis of the larynx, tuberculous laryngitis and malignancy of the larynx. Spielberg (2) states that the first mentioned condition may attack the larynx in the form of a gumma, as an ulcerative process, or in the form of perichondritis or necrosis. He mentions further that dyspnea may take place gradually or suddenly, as in the case of edema with too rapid encroachment on the glottic space. It is easily apparent that a malignant growth developing rapidly and finally obstructing the lumen of the larynx could give a syndrome essentially resembling the onset of laryngeal diphtheria.

SCARLET FEVER.

This disease, when appearing with all its typical features, is not difficult to diagnose. It is perhaps unfortunate, however, that so many of the textbooks lay such particular stress on the typical symptoms and signs, considering the atypical pictures of minor significance. As a consequence, those inexperienced in contagious diseases hesitate to make a diagnosis unless the case presents itself as conforming to the textbook description. As a matter of fact, in a large number of instances, this disease presents a variety of atypical clinical syndromes, leaving room for a wide range of error in diagnosis. The rash is perhaps responsible for a large number of mistakes, since there are many factors entering into the production of a typical scarlatiniform erythema. These we shall refer to presently.

The typical case presents four cardinal symptoms: 1, a congested throat, varying in intensity; 2, a red coated tongue, with raised papillæ—the socalled strawberry tongue; 3, fever, ranging from 102 to 105 degrees; and 4, the rash punctate, erythematous. Sore throat, headache and vomiting are commonly associated features. The pulse is rapid, there is a moderate degree of prostration, and glandular enlargement. The onset is sudden, varying in character in children, in whom convulsions are a common initial symptom. Circumoral pallor is visible depending upon the intensity of the flush on the face. From the viewpoint of diagnosis it is of minor importance. The rash presents a number of variations, all of which are within the limits of the typical case. The color varies from a pale red to that of a boiled lobster, and sometimes to a dusky red. It may appear in blotches, leaving many free areas, especially on the extremities. In many instances it assumes a vesicular character (scarlatina miliaris). There is usually some exudate in the throat, probably of a streptococcic nature. These are the essential features of the ordinary case of scarlatina. We shall not discuss the course of the disease nor its complications, as we are concerned here only with the clinical signs and symptoms and their significance in diagnosis.

Early in the disease, before the eruption has appeared, it is not uncommon to have the streptococcic exudate in the throat interpreted as a diphtheritic membrane, and a diagnosis of diphtheria made. The following case illustrates this error.

Case VII.—A boy of six years was admitted with a diagnosis of diphtheria. He had a bilateral cervical adenitis, the throat was congested, the tongue was coated, with a red tip and prominent papillæ. A small whitish patch of exudate was seen on each tonsil. The temperature was 103°, and a faint erythema could be seen over the body, to a less extent over the extremities. He was placed in isolation, and the following morning a typical punctate, erythematous rash appeared over practically the entire body. The throat symptoms were accentuated, the tongue was characteristic, and there was a fairly well marked constitutional reaction. The entire clinical picture at once made it apparent that we were dealing with a scarlatina. The exudate on the tonsils had, in this case, been responsible for a diagnosis of diphtheria. A consideration of certain characteristic differential points might have resulted in a correct diagnosis in this instance. In the first place, in a large proportion of cases of early scarlet fever, the throat presents a greater degree of congestion than in diphtheria, and there is invariably a greater or less amount of exudate distributed over the tonsils and the posterior pharyngeal wall. It is of a mucoid consistency, and does not have the conformation of a true diphtheritic membrane. Again the degree of pyrexia is usually higher than in diphtheria, and the tongue is characteristic. Lastly, the presence of a definite angina, a high fever, a history of headache, sore throat and vomiting, together with suggestive blush over the body, should at once suggest scarlet fever. It is safe to make such a diagnosis tentatively, watching the case closely for the development of a more characteristic rash. However, in the absence of fairly well marked symptoms, and in the event of doubt as to the true nature of the exudate, a safety first measure in the form of antitoxin is always indicated. By far the greatest source of error in the diagnosis of scarlatina is the scarlatiniform eruption. A toxic rash may simulate all its essential features.

THE INTERPRETATION OF RASHES.

The interpretation of a skin eruption suggesting one or more of the acute exanthemata is often difficult, partly because of the presence, in many cases, of confusing clinical symptoms, and partly because of the many conditions which may produce eruptions resembling them. A brief discussion of these will perhaps emphasize the points to be considered in the differential diagnosis, besides illustrating some common errors.

Certain drugs, when taken over a long period, not infrequently produce eruptions simulating measles or scarlet fever. Chief among these are antipyrine, copaiba, chloral, cubebs, bromides, the salicylates and belladonna. It is therefore apparent that a careful inquiry regarding medication is important in ascertaining the underlying etiology of the prevailing eruption.

Serum rashes are another source of confusion, and we have seen this well illustrated in cases of diphtheria, following the administration of antitoxin. These eruptions may be classified into, 1, the scarlatiniform; 2, the morbilliform, and 3, the urticarial. The first presents all the features of a true scarlatinoid rash; the second simulates measles; and the last is characterized by the formation of wheals commonly seen in urticaria. The time of appearance of the rash varies, the limits being from one day to several weeks. A careful analysis of the associated symptoms and signs, together with a knowledge as to whether or not any serum has been injected, is of the utmost importance in sidestepping a diagnostic pitfall.

Erythema scarlatinoides.—This is a condition characterized chiefly by a diffuse erythematous rash conforming closely to that of scarlatina. Scholz (3) states that a differential diagnosis of scarlatinoid erythema from scarlet fever cannot be made on purely dermatological grounds, but only on the clinical associated symptoms. Even then it can be done only in typical cases. The accompanying constitutional symptoms in scarlet fever form the chief guide in diagnosis. A simple scarlatinoid erythema presents none of the symptomatic features of scarlet fever, except occasionally a rise in temperature. Furthermore, desquamation appears within twenty-four to forty-eight hours following the rash. While it is true that in many cases of scarlet fever there is a primary desquamation occurring within three to five days of the full development of the rash, the clinical picture associated is the guidepost in diagnosis.

Scarlatiniform type of rubella.—This type of rash often leads to confusion, as it closely simulates that of scarlet fever, but here again the intensity and character of the symptoms and signs come into play. In rubella the constitutional reaction is mild, the throat and tongue are negative, and there is little or no fever. The rash appears on the face and spreads downward, while the color is inclined toward a coppery hue rather than the pink blush of scarlatina.

Erythema infectiosum.—In this condition the rash appears first on the face in the form of a reddish efflorescence, symmetrically distributed especially on the cheeks, and bearing some resemblance to erysipelas. On the second day the eruption spreads over the body, being especially well marked over the gluteal region and the outer surface of the arms and legs. The trunk is involved only to a limited extent. It is morbilliform in character, more macular than papular, and, when fully developed, may resemble the eruption of rubella. The latter, however, is characterized by uniform distribution over the entire body, discrete, macular, and sometimes confluent. It is further characterized by its short course and duration.

Extensive erysipelas.—This sometimes resembles the rash of scarlet fever, but is differentiated by the sharp line of demarcation and the dusky, indurative appearance. It has no punctate character and the boundaries of the areas involved are sharply defined.

Milaria vesiculosa.—Scarlatina miliaris is rather closely simulated by milaria vesiculosa so that it is not uncommon to have these conditions confused. The former, however, is often associated with intense itching and burning, and has none of the characteristic symptoms and signs of scarlatina. The attending lesion consists of multiple vesicles situated on a red base, followed in a few days by a fine desquamation.

Eczema.—Certain forms of eczema, notably a diffuse type involving extensive areas and of an inflammatory, erythematous nature, may cause confusion at times. However, the severe itching associated with this condition, with the absence of the characteristic features of the exanthemata, will usually place one on the right path of diagnosis.

We have briefly outlined some of the skin eruptions which sometimes lead one into erroneous diagnosis with regard to the exanthemata. It is quite apparent that a careful study of all skin manifestations is essential for thoroughness in diagnostic methods relative to the contagious diseases. We shall discuss the differential points regarding the lesions in varicella and variola in the description of the chemical pictures of these diseases.

PERTUSSIS.

The symptoms and signs of this disease usually follow a typical course. There are, however, cases in which the train of symptoms present some atypical features, so that the diagnosis cannot readily be made. Again there are certain symptomatic variations which strongly suggest the prevalence of some other disease, leading in many instances to a wrong diagnosis.

The catarrhal stage of this condition is ordinarily characterized by the symptoms of a tracheobronchitis, such as cough, hoarseness, coryza, fever and malaise. There may or may not be definite signs in the chest. Usually a few scattered râles may be heard. It is during this stage that laryngeal irritation not infrequently gives rise to a croupy cough similar to that of a laryngeal diphtheria. Here again, in the event of doubt, the laryngoscope settles the question.

Pertussis in infancy offers a difficult problem in diagnosis, since frequently they are few typical symptoms, the paroxysmal cough invariably being absent. Griffith (4) states that in severe cases in infancy the occurrence of cough without whoop but followed by attacks of apnea is strongly suggestive of pertussis. This is well illustrated by the following case:

CASE VIII.—A male infant of five months (admitted at another hospital) was brought in by the mother, the chief complaint being cough followed by periods during which the child did not appear to breathe. Examination revealed a well nourished infant, apparently comatose. The periods of apnea were well marked, followed by short, feeble coughing, not paroxysmal or whoopy. Cyanosis followed each attack of coughing, the normal color returning after the attack. These were the only characteristic symptoms. History brought to light the fact that the child had been exposed to whooping cough, the mother stating that an older child had recently had the disease. On the basis of this and the peculiar type of cough, a diagnosis of pertussis was made. Treatment was of no avail and the child died on the following day. Autopsy showed a bilateral basal pneumonia, which was a complication of the primary condition.

VARICELLA AND VARIOLA.

The differential diagnosis of these two conditions is not always a simple matter, and it is often difficult to ascertain which one we are dealing with. There are, however, certain characteristics attending each, which, if carefuly noted, will obviate many errors in diagnosis. The former is a disease common to infancy and early childhood, the latter to adults. In varicella the constitutional symptoms are slight, while in variola they are of a varying grade of severity. The essential features of the eruption of the former are: 1, that the lesions appear in crops; 2, the rash makes its appearance first on the face and back, less often the limbs; 3, the lesions are most numerous on the back and trunk, but attack all parts; 4, because of the appearance in crops, the lesions may be seen in all stages of development, from macule to crust. In the latter, the lesions go through an evolution covering a period of eight to nine days; the first lesion is a red macule, which becomes papular, vesicular, and pustular as the disease progresses; the vesicles are multilocular; the pustules assume a globular form, without umbilication; it may remain unruptured, with a secondary umbilication developing. The face and wrists are the first sites of attack, extending to the hands, head and arms, and lower extremities, reaching its height of development in about twenty-four hours. The trunk is the least involved. The lesions may also be found on the mucous membranes of the mouth, pharynx, and nose. Desquamation appears about the twelfth day of the eruption.

Impetigo contagiosa sometimes resembles varicella, but the irregular distribution of the lesions, due to autoinoculation, is a distinctive differential point. The lesions are generally discrete, and involve the scalp, face and hands primarily. There is little itching and practically no constitutional symptoms.

MUMPS.

There are several conditions which may simulate acute epidemic parotitis, serving as sources of error in diagnosis. Acute cervical adenitis is a common one. In this condition, however, the swelling is most marked below the jaw, while in mumps it is just in front of the lobe of the ear. The course of adenitis is more prolonged, and there is likely to be more of a constitutional reaction. The swelling is also more tender.

A secondary parotitis developing in the course of other diseases such as typhoid fever, is unilateral and has a tendency to suppuration. It is not uncommon to have diphtheria diagnosed as mumps because of the extensive adenitis. The throat symptoms, however, are conclusive. An infected molar tooth many times causes marked swelling which is often mistaken for mumps. Careful dental examination will usually reveal the true condition.

The purpose of this paper has been to present some common errors met with in dealing with the acute contagious diseases, so that some idea may be had of the numerous sources of error, the behavior of atypical cases, and the diversity of clinical pictures which might easily lead one astray. The large number of cases seen at this institution has afforded us ample opportunity to note particularly the relative frequency of diagnostic error, the types of mistakes commonly made, and the proportion of cases with atypical syndromes. We have made no attempt to go into detail regarding the differential diagnosis of these diseases, but have rather limited ourselves to a discussion of the variety of errors met with. The diagnosis of contagious diseases in atypical forms is by no means an easy matter, and it is with the purpose of stimulating greater care in the analysis and interpretation of symptoms and signs that we have presented these case reports. Infallibility is a superhuman virtue which none of us can hope to possess. Carelessness and laxity of methods, however, are traits of which too many of us are guilty. It is, therefore, more in the nature of a plea for better care and methods in diagnostic work that we have outlined these cases, which in themselves are argumentative. A great artist, when asked how he mixed his colors to obtain such wonderful effects, replied: "with brains, sir!" The point of which is obvious as applied to diagnostic work.

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The Rapid Cure of Cystitis in Children

By JOHN COOKE HIRST, M.D.,

Philadelphia, Pa.,

Chief Obstetrician to St. Agnes' Hospital.

Every physician is familiar with the distressing symptoms of acute cystitis and pyelitis in female children. Fortunately relief can be secured very quickly, in many cases after one treatment only, and the contrast to older methods of palliative treatment is very marked.

The symptoms need little consideration, except upon one point to be mentioned shortly. The very frequent urination, violent tenesmus and spasm, the cloudy urine loaded with pus cells, leave no possible doubt as to the correct diagnosis. The most common infecting agent is the colon bacillus and the vagina is often infected as well. This naturally causes considerable redness and edema of the labia and vaginal mucosa and a fairly profuse yellow purulent discharge. I have been struck by the frequency in which, in my consultation practice, a diagnosis of gonorrheal vulvovaginitis has been made in these cases. The diagnosis has been based entirely upon the discharge and its color, in spite of the fact that no gonococci have been found, and much valuable time has been lost in treating the patient on this mistaken basis, naturally without favorable result. I cannot too strongly urge the prompt recognition of the true nature of the infection and the avoidance of a diagnosis of gonorrhea simply because the child has vulvovaginitis and a profuse yellow discharge.

The proper treatment is astonishingly simple and easy and in my experience invariably rapidly effective. It consists in the injection into the bladder of five c. c. of a ten per cent. solution of silvol or neosilvol, to be retained if possible. The retention of the solution seems to be of secondary importance, however. In very young children it will promptly be evacuated, but enough seems to remain in the vesical base to secure the desired result. It is very unwise to use more than five c. c. at a time, as a larger quantity is sure to be expelled, and any chance of retaining it will be lost. Silvol makes a solution strongly resembling argyrol, and has the same happy faculty of staining everything it touches a deep brown. Neosilvol makes a turbid yellowish solution, is equally effective, and does not stain at all. For this reason I employ the neosilvol solution routinely, although it does not keep as well as the silvol and should, therefore, be prepared in small quantities. It is undeniably better, though somewhat troublesome, to prepare the solution fresh for each treatment, although for a week or two the neosilvol stock solution shows no sign of deterioration. These silvol salts are so far superior in their results to any other I have used that I now employ them routinely for all bladder or kidney pelvis irrigations.

TECHNIC.

1. The child is arranged in the dorsal lithotomy position, and its knees held apart by an assistant or nurse.
2. Anesthesia will occasionally be required, because of the child's unruliness, and not because of any pain caused by the manipulations. Light ether or chloroform anesthesia is all that is needed, for a few seconds only.
3. A small soft rubber catheter is boiled and inserted into the bladder, after proper preliminary sponging and cleansing of the vulva.
4. Urine in the bladder is allowed to flow out.
5. No irrigation of the bladder is required and it is a waste of time to do it.
6. Through the catheter is injected, by a piston syringe, five c. c. of ten per cent. silvol or neosilvol solution, and the catheter quickly withdrawn.
7. In most cases the solution will be retained from fifteen minutes to several hours. The younger the child the more likely the shorter retention. Even if it is passed at once, sufficient residue will remain to do the work. It is not necessary immediately to repeat the injection, as it will only be evacuated again, more promptly than before.

RESULTS.

In most cases the results are immediate. The tenesmus promptly ceases, the frequency of urination diminishes or disappears, and the child is immediately comfortable and quiet. If the symptoms recur or the urine does not promptly clear, the injection can be repeated. I have found this rarely necessary, however, in the acute cases. In older girls of six or seven, who have had cystitis of long standing, with occasional exacerbation, repeated injections are often necessary, but in the acute cases, especially if no time has been wasted on medicinal or mistaken treatment, the results are prompt and satisfactory.

The age of the child has no bearing whatever on the practicability of the injections. The urethra of a female child is surprisingly distensible, as is well known, and no difficulty will be encountered. I have carried it out in an infant one month old, without trouble. In babies, of course, the ability to retain the solution is a matter of luck, and its prompt evacuation need not cause any concern.

The results have been so uniformly successful that a couple of illustrative histories will suffice to show the reaction to be expected.

CASE I.—A little girl, two and a half years old, was brought to me suffering with vulvovaginitis and cystitis. She had violent tenesmus, very great frequency and would scream with pain whenever she attempted to empty the bladder. This condition had been present with varying severity for over two months. Because of the vulvovaginitis, gonorrhea had been diagnosed, and the child treated accordingly, without benefit. The bladder was injected with ten per cent neosilvol solution, which was evacuated after a few minutes' retention. No attempt was made to repeat the injection at that visit. The mother reported that the child slept better that night than for several weeks, but still had some tenesmus and frequency. The next day the injection was repeated at 3.30 p. m. The child retained the solution until 7.45 p. m. when it was evacuated without pain. Frequency and tenesmus ceased, and she slept all night. These symptoms did not return. In three days the urine was microscopically free from pus, and the child perfectly well. There has been no recurrence of the cystitis.

CASE II.—A little girl, aged two years and nine months, had had cystitis for over four weeks. Very frequent urination and great tenesmus. The frequency at night was so great that sleep was impossible. There was no accompanying vulvovaginitis, and the child had been treated for four weeks, upon a proper diagnosis, with only slight benefit. She was very much frightened and unruly and light ether anesthesia was needed to enable me to catheterize her. She was anesthetized, partially only, for a few moments. Eight c. c. of freshly prepared ten per cent. silvol solution was injected in the bladder, at 7.15 p. m. To my surprise this was retained until 11.30 p. m. without evidence of discomfort. It was then evacuated without pain. She slept all night, except for one painless urination at 4.30 a. m. The tenesmus, frequency and pain had all disappeared the next morning. The urine showed pus, microscopically, for three more days, and was then free and has remained so. The child was symptomatically well within twelve hours of the injection and was comfortable immediately. Only one injection was needed.

The case histories reported are by no means exceptional. I have learned to expect immediate favorable results, and have no faith whatever in the so-called palliative treatment. These injections are easily made, require no special skill and the instruments required are in the possession of every physician in the land. I feel very strongly that, if in these cases of acute cystitis the bladder is immediately drained and the solution injected, the favorable results will be prompt and an incalculable amount of suffering will be saved these children, not only at the time of the attack, but in later years, by preventing the establishment of a chronic cystitis, at that time much more difficult to control.

Acute cystitis is much more common in female than in male children. My work deals entirely with the female child and I have had no experience with the male. I see no reason, however, why it could not be as successfully treated, the sole difference being the greater difficulties of catheterization.

1823 PINE STREET.

Acute Mastoiditis with Facial Paralysis and Remittent Meningitis*

By A. ROTH, M.D.,
Brooklyn, N. Y.,
Associate Laryngologist to the Jewish Hospital, Brooklyn; Attending Otolaryngologist to the Beth Moses Hospital.

This case of otitic meningitis is reported because of its unique clinical course.

The patient, a robust man of twenty-eight, presented himself to me on the third day after the appearance of the initial symptoms of acute otitis media. Examination disclosed the classical evidences of acute osteomyelitis of the mastoid process. He was admitted to the Brownsville and East New York Hospital the same evening and an operation was to be performed in the morning. On my visit to his bedside before operation I was surprised to find that a complete facial paralysis on the side of the disease had developed since he entered the hospital.

On opening the mastoid I found a rather extensive destruction and it was necessary to remove the whole tip. But the sinus plate and the bony roof of the mastoid and tympanic cavities were not involved and there was no evidence of exposure of the facial nerve in the posterior wall after complete removal of the diseased structure.

Ten days after operation the facial nerve had entirely recovered its function and there was no sign of paralysis, and the patient was discharged from the hospital in excellent condition. For nearly six weeks thereafter he came to my office for dressings and had never complained during this period. The wound was nearly closed when the patient began to experience pain in the same ear and in the right side of the head. After three days of careful observation, the symptoms becoming even more acute, I sent him to the Beth Moses Hospital where I was on service.

The clinical data of the next two days were as follows: temperature between 99° and 103°; headache more diffuse; eyegrounds normal; general neurological examination negative; blood culture found sterile. In view of the increasing severity of the symptoms, however, I reoperated for exploratory purposes, this time deliberately uncovering the whole course of the sigmoid sinus. This exhibited no pathological changes whatsoever. The bony roof of the mastoid and middle ear was solid and free from any carious process. There were no fistulæ; no areas of disease were discoverable. From an exploratory viewpoint the operation was valuable in that it eliminated the mastoid itself as the seat of the present trouble. It seemed advisable to give further study to the case before removing the mastoid roof.

The patient was closely observed during the next two days; examination of the cerebrospinal fluid proved normal; the laboratory gave no clues; the headaches continued with the same severity and the man was becoming exhausted. Therefore, I decided to expose the middle and posterior fossæ. Extensive removal of the tegmen of the mastoid and middle ear, thus exposing the temporal dura, revealed no pus. The posterior fossa was then exposed in the small space situated between the anterior border of the sigmoid sinus and the external semicircular canal and no epidural abscess was located here. The appearance of the dura in both anterior and posterior fossæ was normal. There were no focal signs of cerebral abscess. Logically there was no alternative but to dress the wound and to await developments.

We were pleasantly surprised following this operation to see a rapid improvement beginning on the second day, the patient being discharged in good condition at the end of ten days. The relief of symptoms might be attributed to the decompression, and the effect which this had was suggestive of a localized irritation of the meninges or even of a circumscribed intradural suppuration which remained limited and quiescent. He came to my office again for dressing, feeling well and never complaining, for two weeks. At the end of this time he took ill quite suddenly with violent headaches and chills and I was called to the house where I found the glaring signs and symptoms of acute meningitis. He was admitted to the hospital the same day. The spinal tap proved the presence of decidedly cloudy fluid.

Four days' study gave us no differential clue as to the existence of the meningitis in sympathy with a cerebral abscess, or whether the sudden manifestation of meningitis was a primary intracranial complication. The questions were logically connected with the period of remission between the decompression operation and the sudden and definite signs of meningitis. There were no bacteria demonstrable in the cerebrospinal fluid at this time and there were no focal signs. The patient was becoming progressively worse. His only chance was the exploratory incision of the temporal lobe and of the cerebellum for possible abscess which in either region might readily exist without local symptoms.

I therefore explored the temperosphenoidal lobe and the cerebellum, and found no pus. The probability of an initial intracranial involvement in the form of a circumscribed meningitis became a more palpable diagnosis of the case, the infection having been carried along the facial nerve sheath at a time prior to operation or during convalescence, the nerve itself receiving the organisms primarily with the acute mastoiditis, through anomolous openings which are known to exist at times in the facial canal and which in this case must have been present in this canal in the region of the posterior wall of the middle ear: or perhaps the corda tympani branch of the facial first became infected.

The sudden manifest meningitis is explainable by the breakdown of the limiting adhesions and the entrance at once of the infection into the subarachnoid space. Repeated examinations of the cerebrospinal fluid finally showed the presence of the Streptococcus mucosus capsulatus. The patient died one week after operation. Autopsy was not obtainable.

Diligent search through the literature failed to reveal the record of a similar case. This case had an uncommon feature in the occurrence of facial paralysis with acute mastoiditis, and a unique feature in the remission of a meningeal process of otitic origin.

815 Eastern Parkway.

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*Report of a case read before the Williamsburg Medical Society, October 10, 1922.

The Value of Percussion in the Early Diagnosis of Lobar Pneumonia in Children

By JOSEPH POPPER, M.D.,

New York,

Adjunct Attending Pediatrist and Director of the Infant Welfare Department, Lebanon Hospital.

It would seem at first glance somewhat superfluous to broach the subject of the physical signs of pneumonia in children at this late date in the development of physical diagnosis. However, Mackenzie has well said that "it is one of the curious matters in medicine that the commonplace and selfevident are the things which are most frequently ignored." In this paper, therefore, I do not hope to present anything new but will dwell upon one important method of examination, its elicitation, and interpretation.

In a recent paper my colleague, S. A. Blauner, made the significant statement that "the diagnosis of pneumonia in infancy and early childhood is distinctly by physical signs." This is so true that anyone who has had any experience with the care of sick children will readily appreciate the value of a thorough knowledge of the physical signs of pneumonia. Of even greater importance, however, is the ability to elicit and place a proper valuation on individual signs.

Numerous experiences during the past few years have shown that the diagnosis of pneumonia is often overlooked or if not overlooked is guessed at purely from the clinical aspects of a given case, where a careful percussion of the chest would reveal the one important physical sign, viz., dulness on percussion. The great value of the finding of dulness on percussion in the early diagnosis of lobar pneumonia in children cannot be overestimated; and yet a perusal of many textbooks on pediatrics shows that only a few place any stress on the subject. Furthermore, on several occasions in recent years, the examination of candidates for admission to hospital internship has almost invariably failed to elicit a proper conception of this subject. Small wonder then that a great many practitioners do not percuss a child's chest, or do so in a perfunctory manner and attach no great significance to their findings. I have seen some very excellent physicians use their stethoscopes most diligently but percuss, if at all, very hurriedly and crudely. The reason seems to be that most of us have been educated to look for the high pitched breathing or the occasional telltale râle, whereas I venture to state that, in lobar pneumonia at least, dulness is present long before râles or high pitched breathing. The opposite is undoubtedly true of bronchopneumonia.

The proposition to be discussed here, therefore, may be stated as follows: Given an infant or a young child who is clinically ill, with fever, with or without cough, and who shows on physical examination dulness or dull tympany localized in an area of the chest which is normally vesicular in resonance, a diagnosis of pneumonic consolidation is justifiable. This statement is based not only on clinical bedside experience but has been confirmed many times by x ray photographs. Moreover, recent studies both pathological and röntgenological seem to prove that dulness must of necessity be the first sign of lobar pneumonia in at least the vast majority of cases in children.

Tripier, from a pathological study, and Weil and Mouriquand, and in this country Mason, from a röntgenological study, have shown definitely that in lobar pneumonia the consolidation invariably begins at that part of the lung nearest the pleural surface. They have also shown that the involvement occurs as a conical shaped mass with its base at the pleural surface and the apex directed toward the hilum. Mason, furthermore, has correlated his röntgen findings with the development of physical signs, an extremely valuable contribution. He found that early in lobar pneumonia a shadow appeared at the periphery of the lung without giving any physical signs. Subsequent radiography of the same patient showed an enlargement of the shadow at the periphery and gradual extension of the shadow toward the root of the lung. This enlargement of the shadow coincided with the gradual appearance, first, of dulness over the area involved, and that only relatively dull, followed by increased dulness accompanied by râles and diminished breathing, and finally when the shadow reached the root of the lung, bronchial voice and breathing.

Mason explains this appearance of bronchial breathing and voice by reference to Tyndal's demonstration that sound is transmitted much better through a medium of uniform density than through a medium of varying density. In the case, therefore, of pneumonic consolidation, tracheal breathing can only be transmitted as such to the chest wall when the consolidation is continuous from the trachea or large bronchus to the chest wall.

By this excellent demonstration it becomes quite apparent that the sequence of the development of physical signs in lobar pneumonia must be relative dulness gradually increasing in extent and intensity followed by diminished breathing with or without crepitant râles and finally bronchial breathing and voice. Undoubtedly exceptions to this rule occur depending upon unusual situations of involvement, such as the diaphragmatic surface of the lung and also depending upon concommittant factors like thickened pleura and fluid. Fortunately, however, these exceptions are extremely uncommon.

This offers, therefore, a ready explanation for the contention of my paper. It also explains why bronchial voice and breathing must of necessity come much later in the disease. It likewise explains several phenomena which have until now been erroneously interpreted. Thus we can understand how a lobar pneumonia may go through its entire course without the development of bronchial voice and breathing, the process stopping short of the hilum. It very beautifully explains a term which was until recently and is to some extent in this day used as a cloak for diagnostic ignorance, viz., central pneumonia. We now know why every case of clinical pneumonia was called central in the absence of râles and bronchial voice and breathing. By the same token we can understand how many a diagnosis of prolonged influenza or pyelitis without pus in the urine or other obscure excuses for prolonged fever were very often pneumonia which was overlooked because too much was demanded in the way of physical signs.

If then, dulness must be the earliest physical sign of lobar pneumonia, what is there about the terms "careful" or "proper" percussion which makes all the difference between the presence of consolidation and its discovery clinically? Just here is the crux of the matter, not that there really is a problem for the method of percussion is the same bimanual method in general use. However, three factors are essential to its proper applications, viz.:

1. Light percussion in an atmosphere of absolute quiet.

2. Proper position of the patient. That refers to a position in which muscular resistance is reduced to a minimum. This is best obtained by placing the patient on his back for examination of the front of the chest and prone with the arms extended above the head for examination of the back. The axillæ and sides are examined in both positions.

3. A familiarity with the normal areas of chest dulness. These are the cardiac area on the left side anteriorly; liver dulness on the right side extending from the lower part of the chest anteriorly around to the lower part of the chest posteriorly; and also two areas of impaired resonance, viz., the right apex posteriorly, which is frequently duller than the left, and the left midaxillary region which often gives a dull tympanitic note when the stomach is dilated.

It is also important to emphasize that dulness is a relative term and its intensity will vary with the amount of consolidation present, so that in a given case a diagnosis may be made when an area is discovered which is only slightly duller than the part of the chest immediately adjacent, or as compared to the corresponding area on the opposite side.

Under the head of diagnosis in lobar pneumonia Holt says: "The difficulties in diagnosis are due to the great variation that is seen in the general symptoms, and to the late appearance of the physical signs. The error usually made is to mistake pneumonia for some other disease, rather than to mistake some other disease for pneumonia. On account of its frequency in children, pneumonia should always be excluded before accepting any other explanation of a continuously high temperature." To this I would add, in conclusion, that a mastery of the art of percussion of the chest will establish a diagnosis in the vast majority of the cases of obscure fever in infants and young children.

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628 East 163d Street.

Typical Quinsy in an Infant

By FRED W. GRAEF, M.D.,
New York.

Acute purulent inflammations of the throat in small children are almost always situated in some part of the wall of the pharynx back of the pillars of the fauces—the socalled retropharyngeal abscess. These are quite common; not infrequent even in very young babies, and as a rule offer comparatively little difficulty in diagnosis or treatment to one accustomed to deal with them. The lax pharyngeal mucosa favors the collection of pus and also the burrowing of such collections in various directions. Marked dyspnea is found as the first urgent symptom in many children and difficulty in taking food with change in the voice is also likely to call attention to the throat. A provisional diagnosis of diphtheria is the most common error in these cases.

Recognition of the mass by the asymmetry of the pharyngeal walls is confirmed by palpation showing the presence of fluid. Often little or no appearance of inflammation about the mass is to be seen. The belief that these abscesses occur mostly in the children of parents with a tuberculous or syphilitic history is not borne out by common experience. They are more likely due to the general tendency to glandular infection and swelling associated with childhood. A short time ago I had a case of throat abscess brought me by Dr. George Krupp, which proved to be a typical case of quinsy and, occurring in an infant only six months old, it seems to me to be of sufficient interest to warrant this report.

The child, a girl, nourished by a combination of breast and bottle feeding, was strong and healthy, and the parents gave no evidence or history of strumous or specific disease. The throat symptoms were of gradual onset but the dyspnea, cough and change of voice had led to a diagnosis of diphtheria when these suddenly became pronounced. The child's mouth was opened with difficulty and incompletely, but examination of the throat showed a typical quinsy of the right side, the anterior pillar bulged forward and the right tonsil pushed well over to the uvula. I had never seen or heard of such a thing in so young an infant, however, and had some hesitation about incising it. When I did cut into it in the usual place a large quantity of pus streamed out and the diagnosis was fully established. It drained and was healed in a few days, very much as such a quinsy would in an adult, without difficulty of any kind.

This was several months ago and I learn from the family physician that the child has had no trouble of any kind since.

I have made some search through available literature and at the library of the Academy of Medicine without finding record of any similar case.

165 West Fifty-eighth Street.

X Ray Studies of Cardiac Diseases in Children*

By W. MORGAN HARTSHORN, M.D.,
and CHARLES WINFIELD PERKINS, M.D.,
New York.

The x ray by means of the fluoroscopic and röntgenographic method in the diagnosis of cardiac diseases, offers valuable assistance in, 1, determining the size, shape, position and action of the heart in relation to the thorax; 2, the condition of the heart muscle; 3, the areas involved; 4, the relative location of the cardiac vessels; 5, the possibility of congenital cardiac disease; 6, the progressive changes in the cardiac muscle as demonstrated through repeated subsequent examinations; 7, indication of associated pulmonary diseases. In the various pathological states of the heart the x ray examinations not only confirm but amplify the clinical findings. The literature in regard to the x ray examination of cardiac diseases in infants and children is at present very limited.

There are two methods of examination, fluoroscopic and röntgenographic. The fluoroscopic method has the advantage of making it possible to examine the patient in every position, besides visualizing the cardiac action and the presence or absence of fluid or adhesions. It is readily adapted for use in very young children.

The plate examination should be made at six feet distance from the tube with the patient in the vertical position during forced inspiration with the breath held. At this distance there is less distortion of the anatomy of the chest. In infants under two years it is practically necessary to make the exposures in the recumbent posture, as rapidly as possible, at a distance of thirty inches. The plate examination gives a permanent record and permits a detailed study of the case.

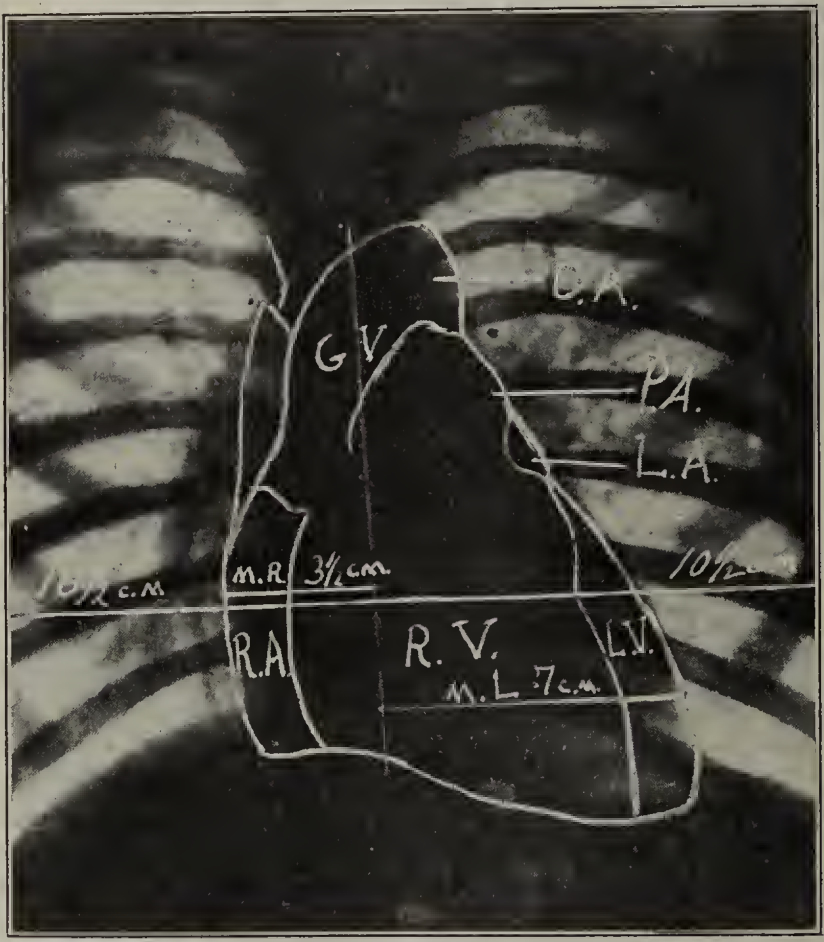

Fig. 1.—Diagram, over a normal heart in a child aged nine years, taken at six feet distance. R. A.: right auricle; R. V.: right ventricle; L. V.: left ventricle; L. A.: left auricle; P. A.: pulmonary artery; D. A.: descending aorta; G. V.: great vessels; M. R.: middle right diameter; M. L.: middle left diameter of the heart. M. R. 3.5 cm. plus M. L. 7 cm. equals 10.5 cm., which is one half the diameter of the chest.

For comparison, a study of the normal size, shape and position of the heart in children is essential. Observations which we have made upon children of different ages from two months to fourteen years show that the size and shape of the heart varies with the size and shape of the chest; for example, a broad-chested child would have a correspondingly broad globular heart, while a narrow chested child would have an elongated heart.

In twenty-one examinations of normal hearts in children whose ages varied from two months to fourteen years, the transverse diameter of the heart through its widest part, equalled or approximated one half the measurement of the chest in a corresponding position. Children under three have a globular heart which appears to be larger than normal, but on measurement corresponds with the findings given above. This measurement is the most important one in the x ray examination of the normal or abnormal heart. It is occasionally found in normal cases that the transverse diameter of the heart is smaller than half the transverse diameter of the chest. It was observed in practically all cases of cardiac disease. While no definite physical signs of involvement of the lungs were found, the x ray examination showed increased peribronchial thickenings, fanlike in character, with intensified linear markings. These were largely confined to the upper lobes of the lungs. Although this condition is sometimes found in normal children in unhygienic surroundings, it is much more pronounced in the patients suffering from cardiac diseases.

Congenital enlargement of the heart has been confused with enlargement of the thymus gland; it is only by röntgen examination of the heart and chest that a diagnosis between these lesions can be made. Distortions of the heart and of the ascending aorta, resulting from imperfect technic in posturing the patient over the plate, should always be considered in making a diagnosis of cardiac and thymic disease.

It is our purpose now to discuss the x ray findings of various pathological lesions of the heart.

CONGENITAL LESIONS OF THE HEART.

This anomaly of the heart is fortunately infrequent, Norris reporting 7.6 per cent. and Still 0.57 per cent. in cardiac cases under ten years. Without clinical findings and the history of the case it would be impossible to make a definite diagnosis of any congenital lesion of the heart from the röntgenograph. In all these the shadow of the heart is enlarged in the right auricular, left ventricular and pulmonic areas. Transposition of the great vessels and dextrocardia, while rare, can be definitely shown by the x ray.

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*From the Pediatric Services of Roosevelt and Seaside Hospitals.

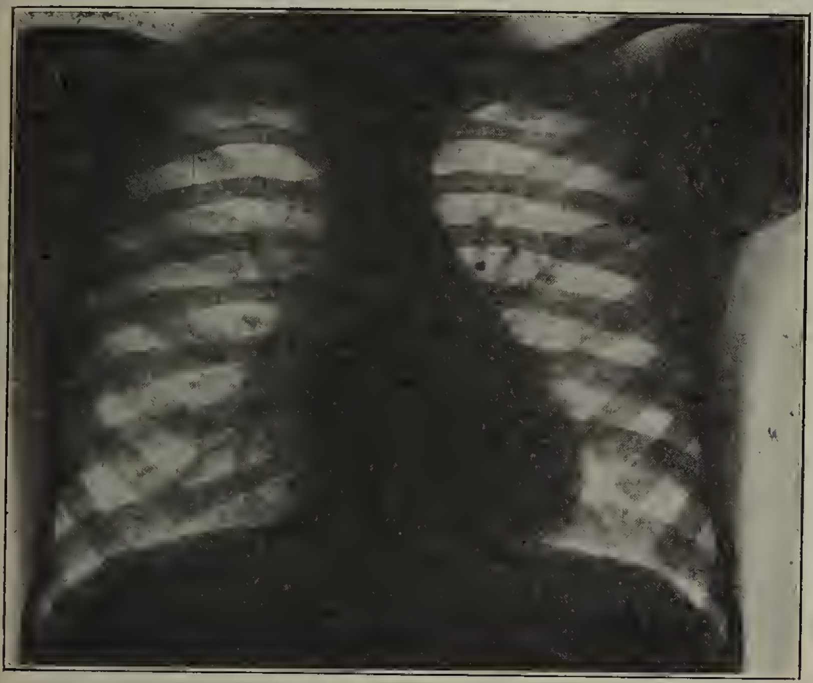

Fig. 2.—Small normal heart of a child aged eight years.

Figures 6 and 7 show the difference between a normal heart and one with congenital lesions at three months, as illustrated by the following case:

Case I.—Baby G., male, three months, was referred by Dr. G. W. Graves, with the following history. The little patient was first seen by Dr. Graves at two months, weight six pounds six ounces. Choking attacks developed when the child was two to three months old, associated with more or less constant dyspnea. There was recession of the suprasternal and infrasternal regions, with moderate cyanosis. Râles were found distributed throughout the lungs several days before the x ray examination. Two days before the x ray was taken there were râles in the right upper lobe anterior chest wall. Percussion was negative. Heart sounds were normal with respiration 40 to 50 a minute. The nutrition improved in one month despite the severe attacks of dyspnea, then the attacks became more marked and on one or two occasions the mother found the baby had ceased breathing and was revived only by mechanical measures. The character of breathing suggested tracheal obstruction similar to that due to obstruction from laryngeal diphtheria. It was noisy but at times moist. Atropine, 1/500 grain, was given every three hours with little effect. Small doses of bromides and ipecac gave some relief. The diagnosis of enlarged thymus was suggested by several consultants, and no other explanation was offered as the cause of the attack, until the röntgenograph re-

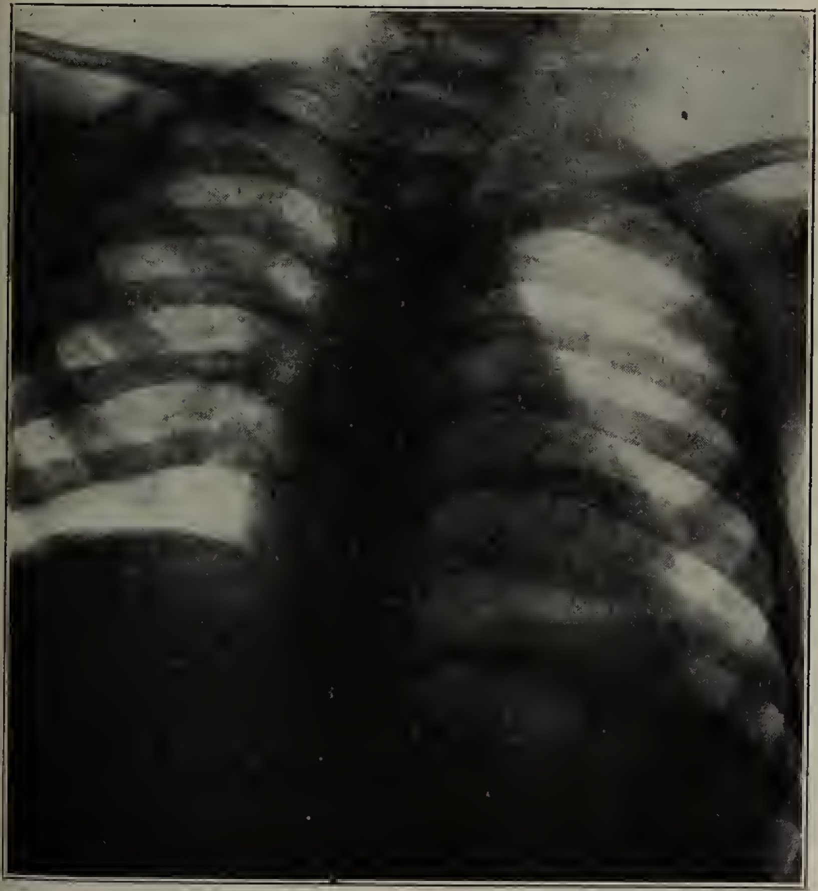

Fig. 3.—Illustrates distortion of heart due to imperfect technic. Normal heart of an eight year old child.

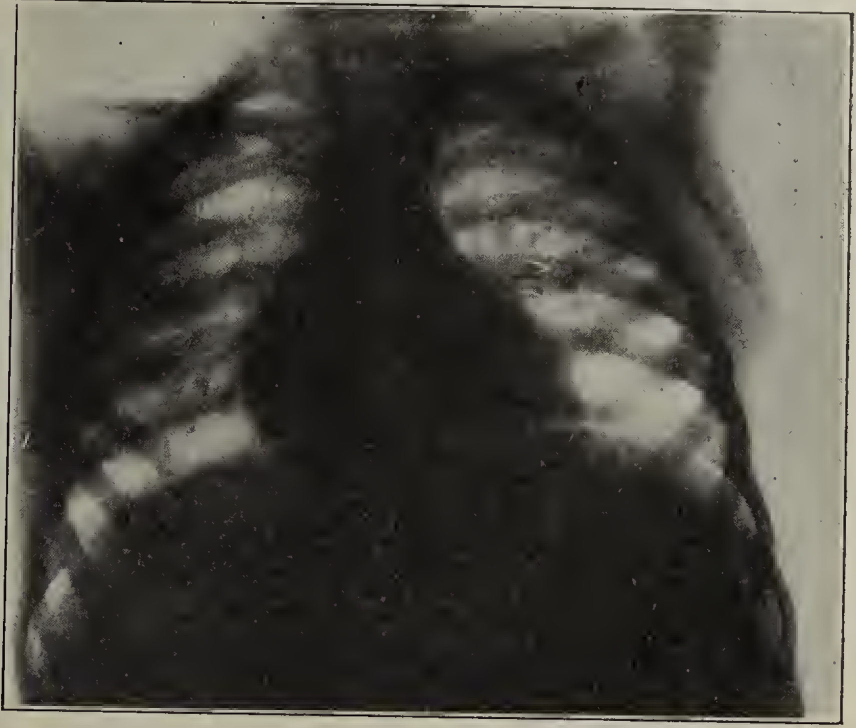

Fig. 4.—Normal heart of child aged two and a half years.

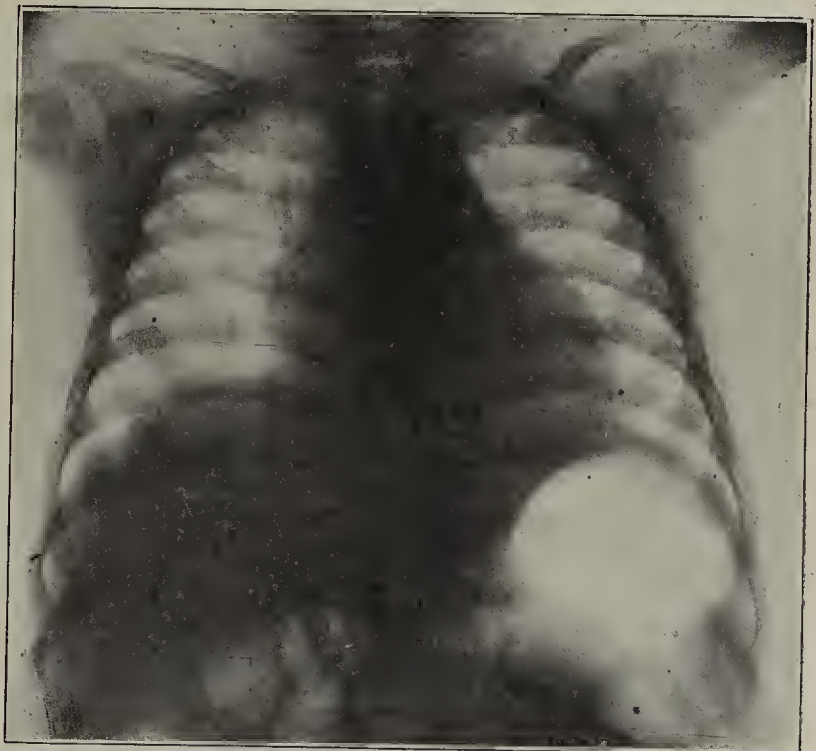

Fig. 5.—Normal heart of an infant aged ten months. Note globular character and broad base.

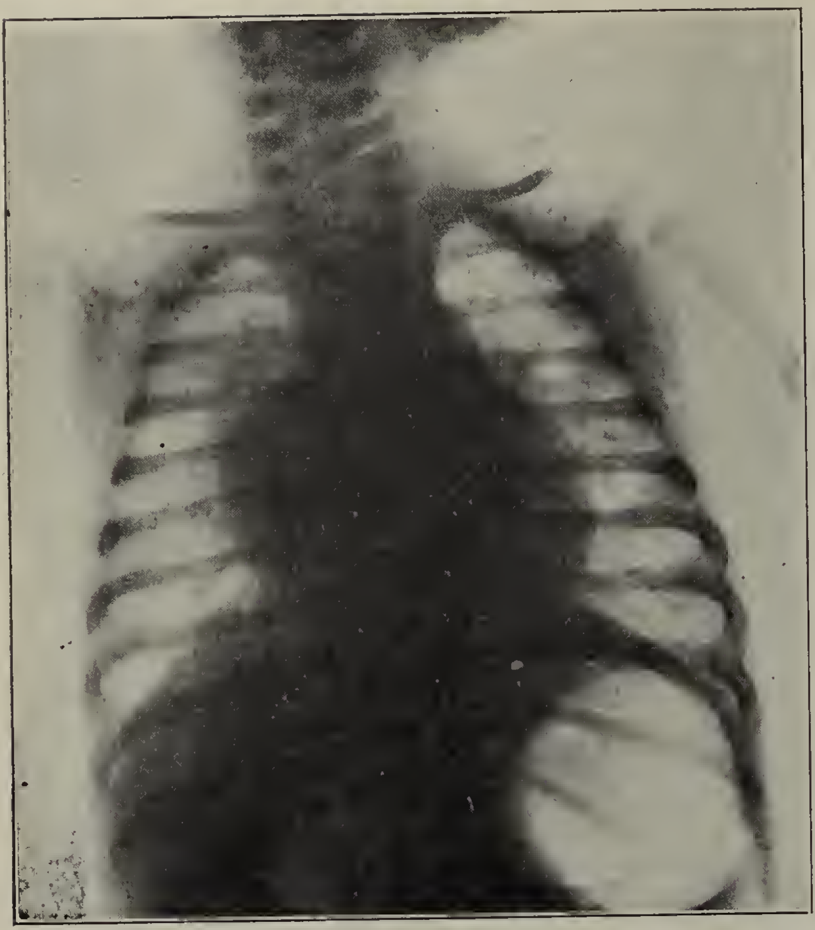

FIG. 6.—Congenital heart of infant aged three months. Note cloudiness of upper right lobe.

vealed the abnormal heart shadow. The baby died three days later. X ray diagnosis was congenital malformation of the heart with bronchopneumonia.

VALVULAR DISEASES OF THE HEART.

Mitral lesions are most frequently found in children as the result of valvular injury. There is marked dilatation with subsequent hypertrophy of the cardiac muscle. This increases the transverse measurement of the heart in comparison with that of one half the chest. If there is also an associated mitral stenosis, as is quite frequent, enlargement of the auricle is present. This is well illustrated by the following cases.

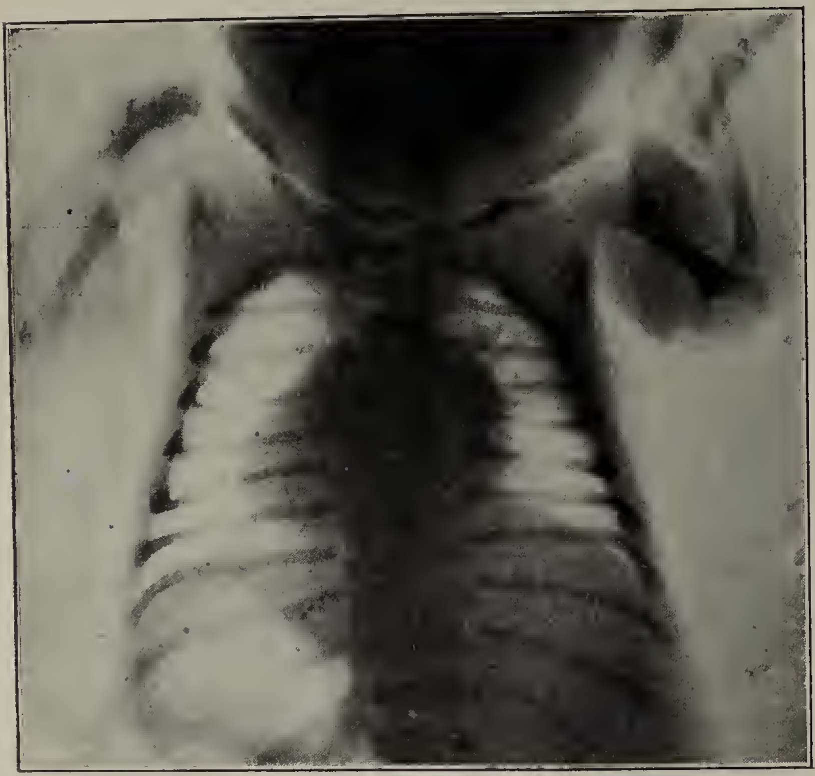

FIG. 6a.—Congenital heart of child aged seventeen days. Very cyanotic. Note cloudiness of the upper right lobe of the lungs.

Figures 8 and 9 show the difference between a normal heart of three and a half years and a pathological heart in a boy of three, suffering from double mitral disease with decompensation. X ray examination at six feet distance showed an enlarged globular heart with enlarged left ventricle and right auricle. The transverse diameter of the heart is three and a half cm. larger than normal. The lungs show a general haziness with evidences of forced respiration as seen in the distention of the chest.

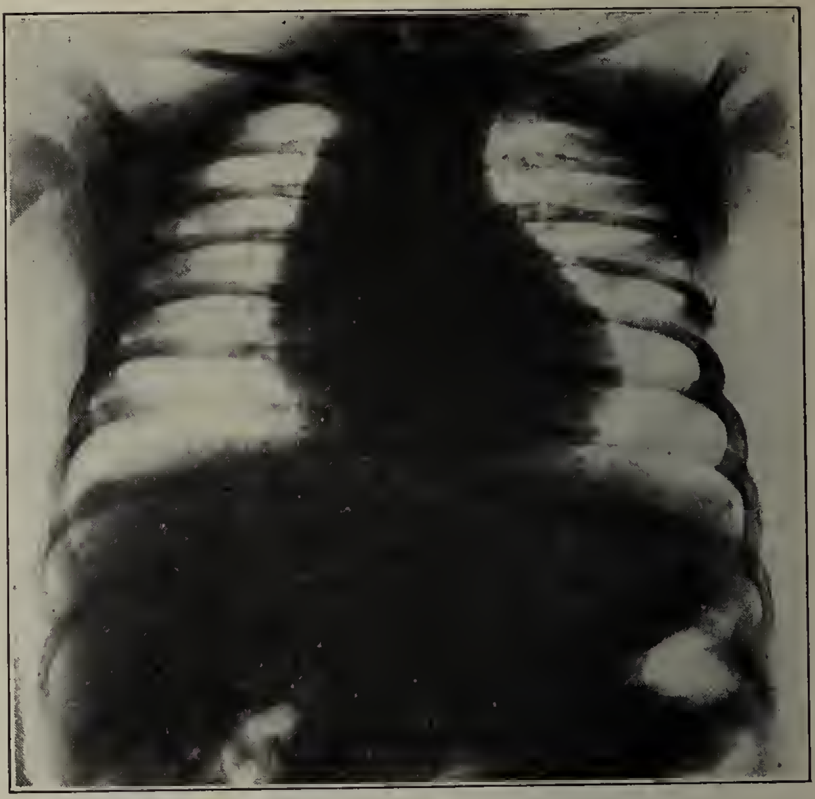

FIG. 7.—Normal heart of an infant aged three months.

Figure 10 shows the heart of a child eight years of age, who entered the hospital with the diagnosis of mitral stenosis and insufficiency. The patient was poorly nourished and slightly cyanosed. Physical examination of the lungs was negative. Heart showed enlargement to the right and left, and presystolic thrill accompanied by systolic and presystolic murmur at the apex.

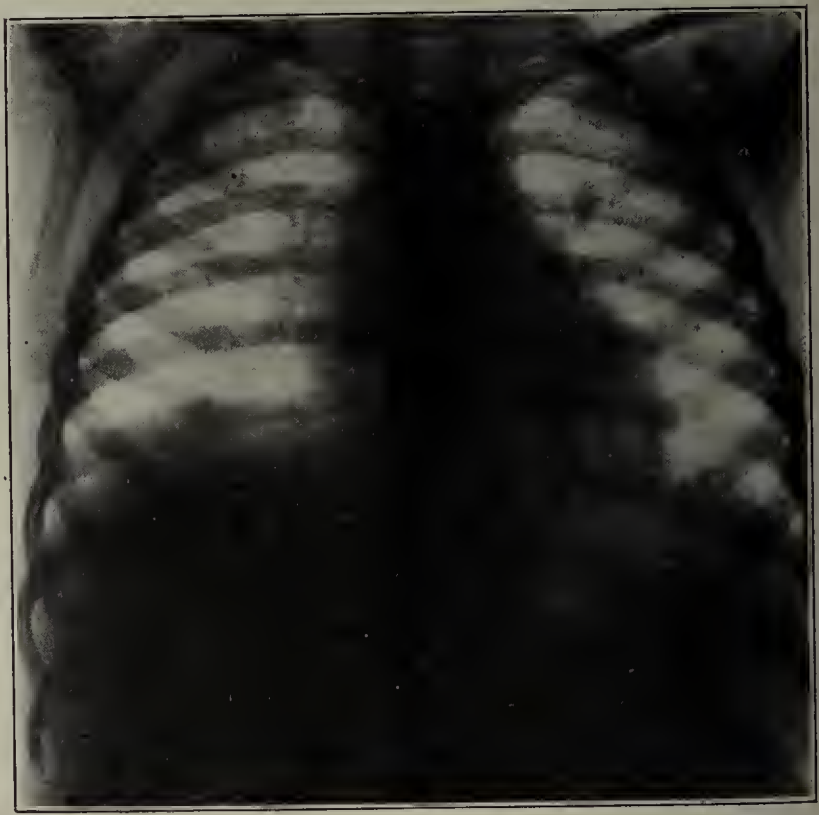

FIG. 8.—Normal heart of a child aged three and a half years.

Teleoröntgenographic examination showed en-

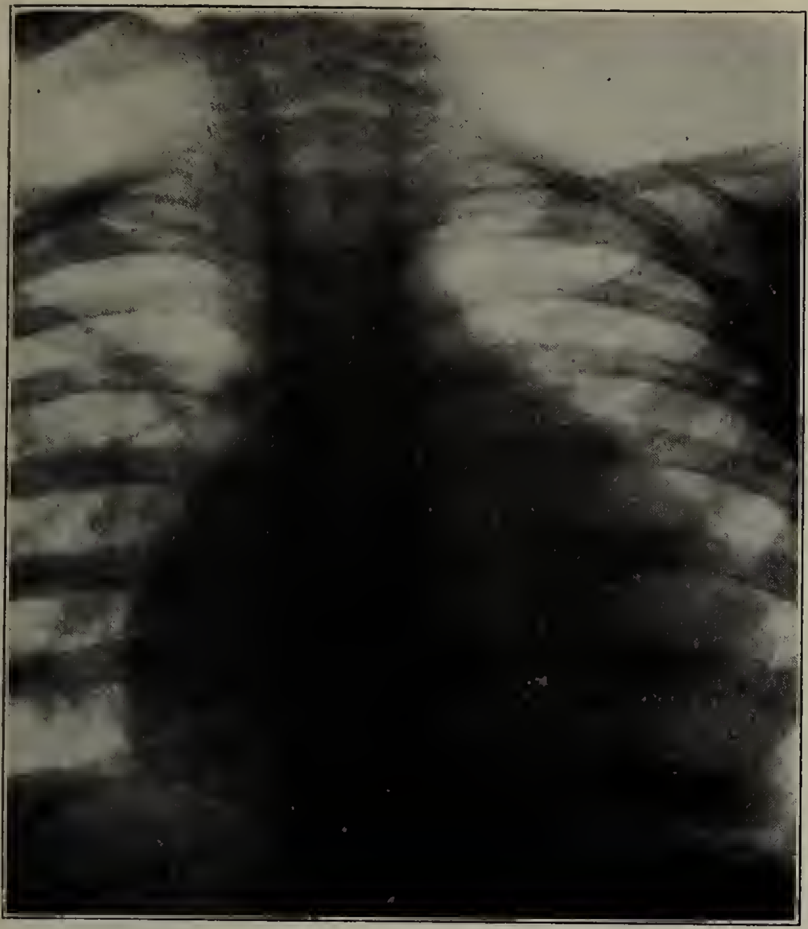

Fig. 9.—Double mitral disease with decompensation in a boy aged three years.

largement to the right and left with the transverse diameter of the heart three cm. larger than normal. The lungs showed increased peribronchial thickenings with linear markings, fanlike in character in both upper lobes of the lungs.

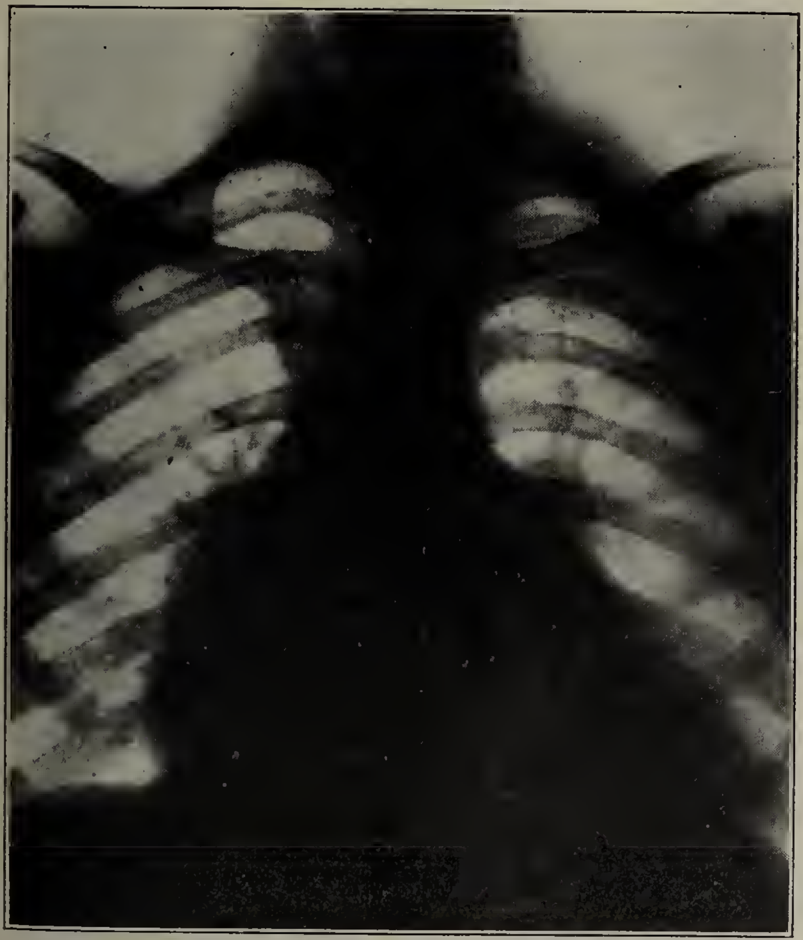

Fig. 10.—Mitral stenosis and insufficiency in a child aged eight years. Note increased peribronchial markings in upper lobes of the lungs.

Figures 11 and 12 show the difference between a normal heart and mitral disease in a boy eleven years old. Examination of the heart showed visible diffuse pulsation over the precordia and neck, with distinct thrill on palpation at apex. Diagnosis was mitral regurgitation and stenosis. The lungs in the left lower lobe presented dullness and râles.

Röntgenographic examination at six feet showed a rounded globular heart enlarged to the right and left four cm. larger in its transverse diameter than normal. The lungs showed haziness in the right middle lobe and base with increased density of the hilus shadow on the right side. The upper left chest showed increased bronchial markings approaching the periphery. The lower left costophrenic angle was denser than normal. The cardiac shadow obscured practically the whole lower left chest.

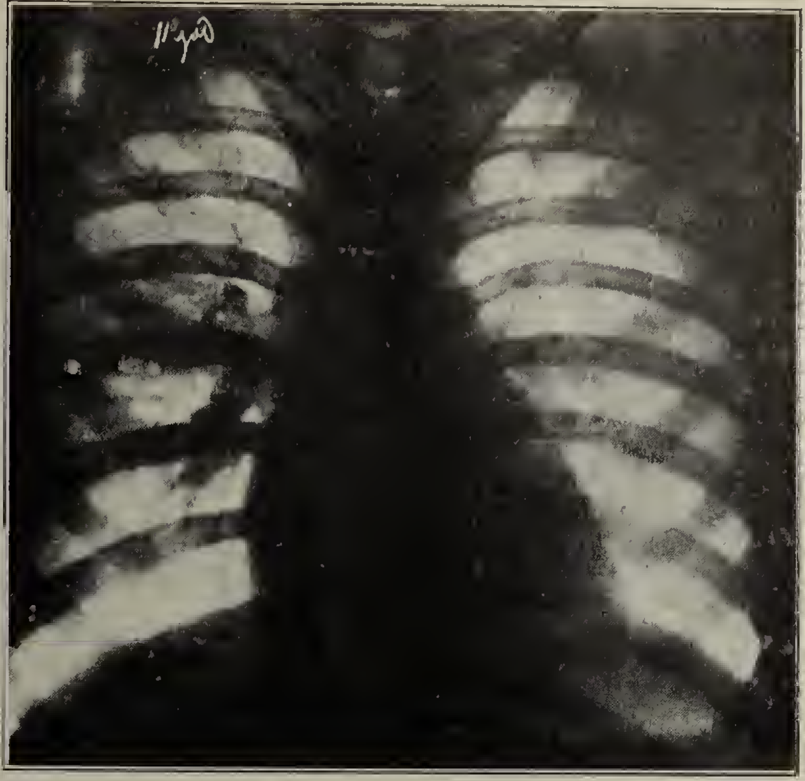

Fig. 11.—Normal heart in a child aged eleven years.

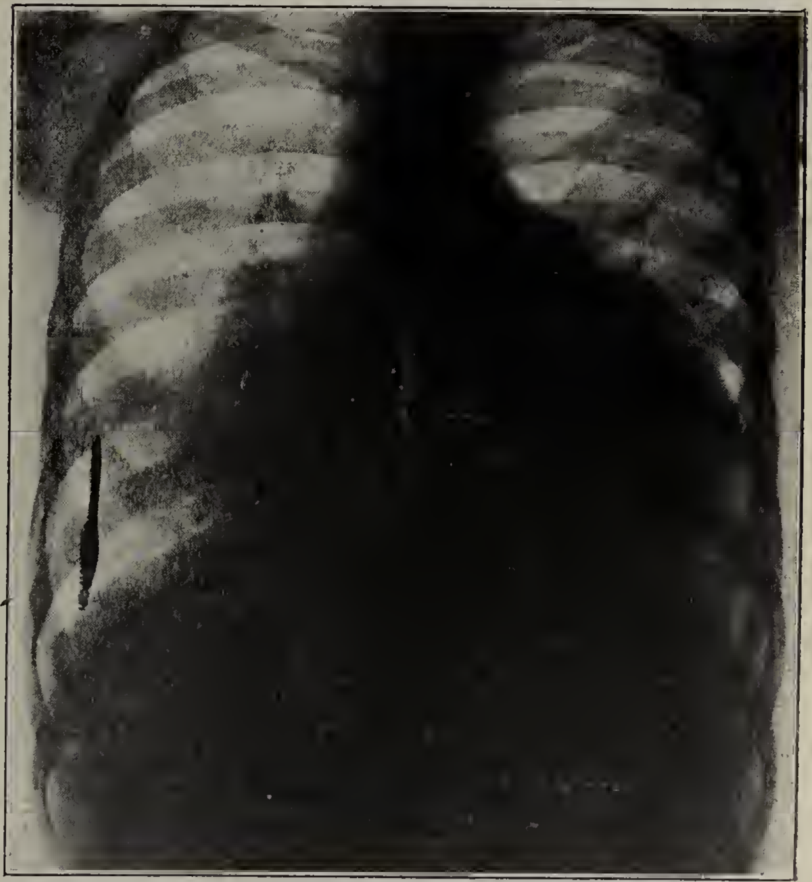

Fig. 12.—Large globular heart of mitral disease in a boy aged eleven years.

Figures 13, 14, and 15 illustrate mitral disease of the heart in patients of ten, eleven, and fourteen years of age, showing enormous enlargement of the left ventricle and enlargement of the right auricular region. Note the increased peribronchial thickenings and linear markings fan like in character confined to the upper lobe of the lungs.

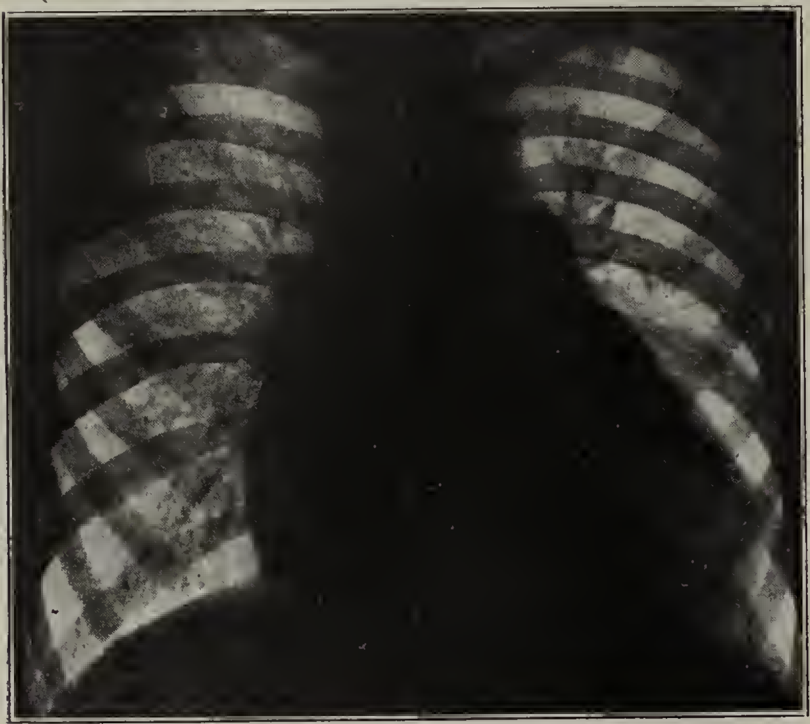

Fig. 13.—Large heart of mitral disease in a child aged ten years. Note increased bronchial markings in upper lobes.

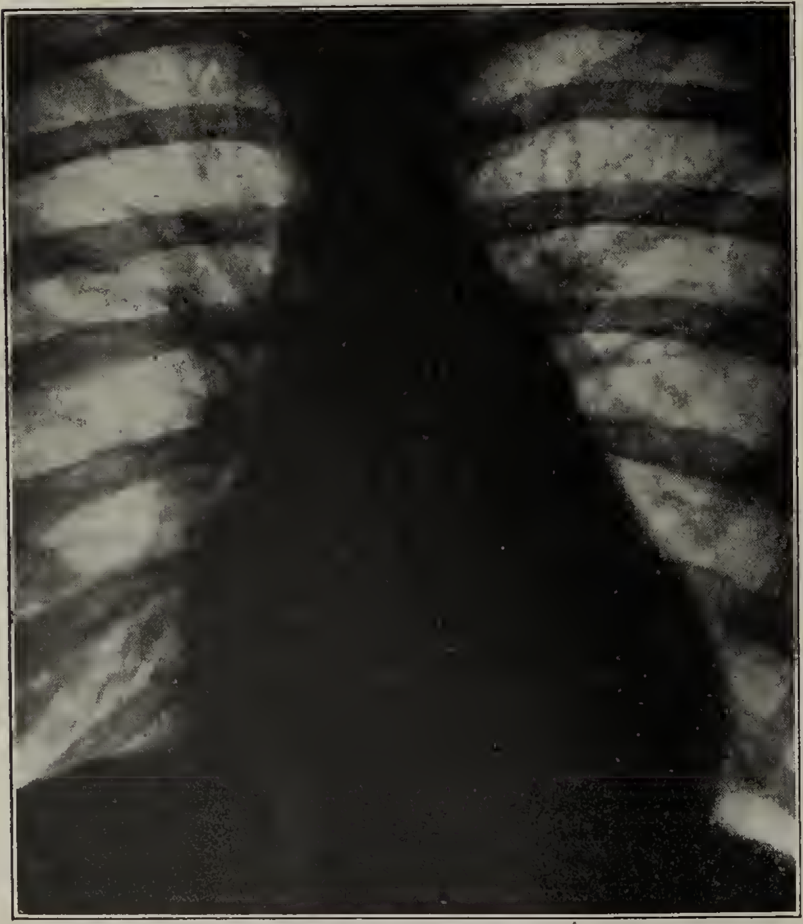

Fig. 14.—Mitral disease in a child aged eleven years. Note the dense bronchial trees fanlike in character confined to the upper lobes of the lung.

Aortic insufficiency and other valvular lesions occur with relative infrequency in young children. Kerley states that the ratio of aortic to mitral diseases is about one to fifteen. We are unable to show any x ray findings of these conditions. In diseases of the myocardium it is important to consider the physical signs in conjunction with the plate findings and the fluoroscopic examination, which definitely visualizes the activity of the heart. The radiograph will show a dilated heart with increase of the transverse diameter.

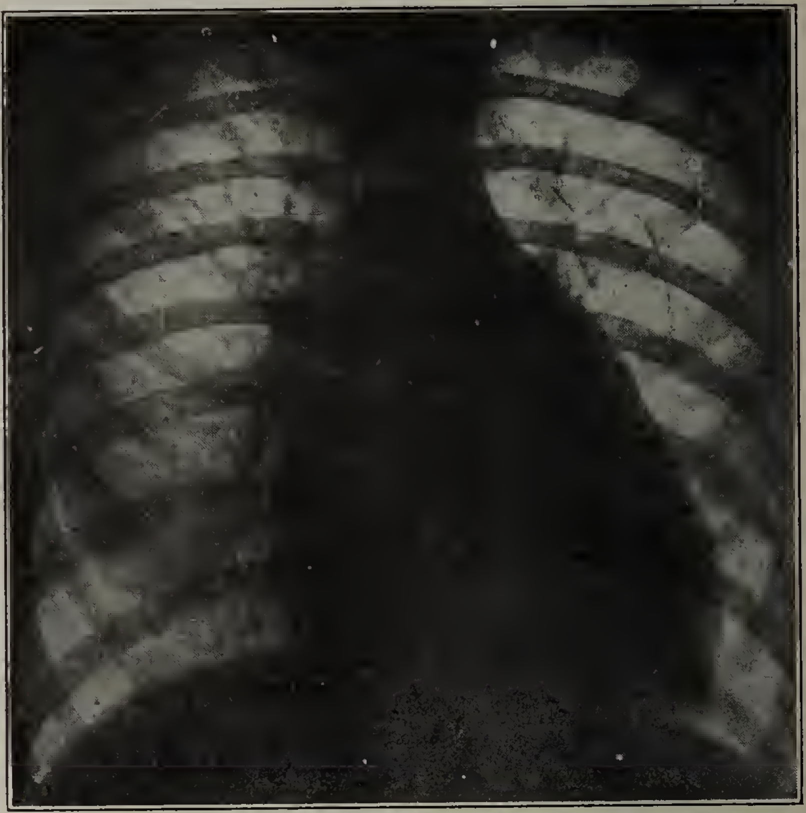

Fig. 15.—Enormous enlargement of the heart due to mitral disease in a child aged fourteen years.

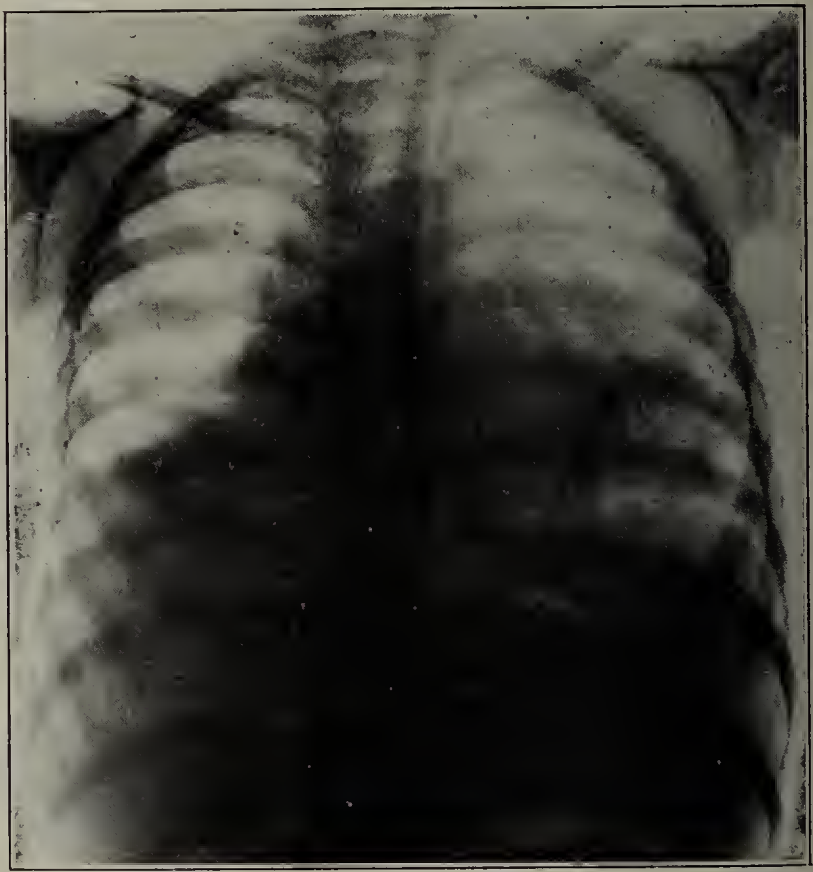

Fig. 16.—Showing symmetrical enlargement of the heart due to pericardial fluid, in a boy aged six and a half years.

Diseases of the pericardium are found in older children. Effusions are differentiated by changes which occur in the physical signs when the patient assumes a recumbent or sitting posture. This can be demonstrated by means of fluoroscopy or the plate examination, in the vertical and horizontal position. Normally there is slight change in the shadow of the heart due to postural changes but in this condition the shadow is more definitely observed.

The x ray findings are as follows: a, heart globular in shape, enlarged symmetrically; b, larger in the recumbent position; c, obliteration of the costocardiac angle; d, diminished visual impulse of the heart on fluoroscopic examination.

Figure 16 shows the röntgen examination in a case of a boy of six and a half years, suffering from disease of the mitral and aortic valves with pericardial and pleuritic effusion. The heart is globular and enlarged to the right and left, with obliteration of the costocardiac angle.

Figure 17 shows the change in the cardiac shadow after aspiration. The heart is diminished in size in its general contour throughout. The costocardiac angle shows the presence of pleuritic adhesions.

From the study of these cases the following conclusions have been drawn:

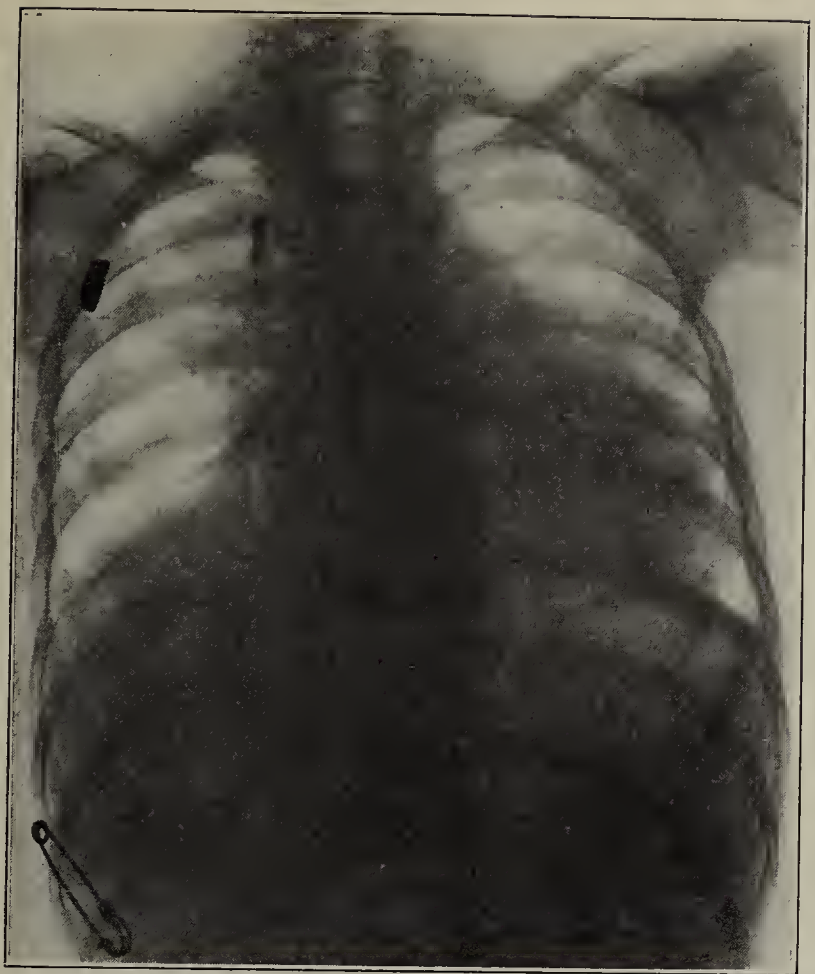

Fig. 17.—Röntgenograph after aspiration. Note diminished size of the cardiac area and adhesions in the costocardiac angle.

CONCLUSIONS.

1. The x ray examination in cardiac diseases of young children is of material aid in confirming physical signs.
2. It presents an accurate method of differentiating normal from abnormal hearts in children at different ages.
3. Progress of the disease may be noted by successive x ray examination.
4. At all ages in the normal, there is a constant ratio between the transverse diameter of the heart and the transverse diameter of the chest.
5. As a method of differentiating between congenital heart disease and thymus disease it is invaluable.
6. Associated pathological conditions of the chest can be demonstrated.
7. Advanced cardiac disease is associated with marked increased peribronchial shadows, fanlike in character, confined to the upper lobes of the lungs.
8. Distortions in the shadow of the heart due to imperfect technic may simulate pathological conditions.
9. Successive x ray examination should be taken in the same positions at some distance and with the same exposure.

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Myocarditis in Children

By J. EPSTEIN, M.D.,

New York,

Attending in Pediatrics, Vanderbilt Clinic; Chief of Pediatric and Cardiac Clinics, Beth Israel Hospital.

The first thing that holds the physician's attention in the routine examination of the heart is that mysterious sound which is commonly called murmur. Since murmurs are largely the result of valvular deformities and endocarditis, the endocardium has received the greatest attention in cardiac diseases. The myocardium, which represents the main structure of the heart, and in which reside the principal functions of the heart, is frequently overlooked. Especially during childhood, when the heart is free from coronary sclerosis and other chronic degenerative changes, the myocardium has received very little of the physician's attention.

It is well to bear in mind that a murmurless heart is not necessarily a sound heart and a murmuring heart does not always mean a diseased heart; that murmurs are vibratory sounds produced in the wall of the heart or bloodvessel by the blood current when it deviates from its normal course, streams over a rough surface, or meets with some impediment. Murmurs may be caused by endocarditis, myocarditis, or myatonia cordis.

Murmurs may be classified as intracardiac and as extracardiac. The intracardiac murmurs may be divided into congenital and acquired. Congenital murmurs are the result of some structural error in the makeup of the heart. Acquired murmurs are due to disease or dysfunction of the heart. The extracardiac murmurs or friction sounds are pericardial, pneumopericardial or pleuropericardial.

For a clearer understanding of cardiac pathology, a murmur must not be looked upon as representing heart disease but as a symptom of heart disease. Valvulitis with its murmurs is the result of heart disease, just as paralysis is the result of brain disease. It is, therefore, erroneous to diagnose a case as mitral or aortic disease, mitral or aortic systolic or diastolic, as is so frequently done. The proper diagnosis should be endocarditis, or myocarditis or myatonia with mitral or aortic or pulmonic insufficiency or stenosis. Whether a murmur is systolic, diastolic, presystolic or prediastolic depends on the time of its occurrence in the cardiac cycle.

Since myocarditis does not produce as many thrilling murmurs as endocarditis, myocardial diseases with all their baneful consequences frequently remain undiagnosed and untreated. There are many more diseases which predispose to myocarditis than to endocarditis and myocardial affections are more frequent than endocardial. Many obscure disorders in circulation, respiration, and digestion can be traced to myocardial insufficiency.

During infancy and childhood, malnutrition, nutritional diseases, and metabolic disorders may cause considerable damage to the myocardium. The structural and functional integrity of the heart muscle depends mainly on an adequate and suitable diet. Any metabolic disorder which will interfere with the proper nutrition of the general musculature, will affect the heart muscle to a great extent, because of the greater nutritional requirement of the heart to keep up its incessant work. Diphtheria, scarlet fever, typhoid fever, influenza, whooping cough and rheumatic fever, are most damaging to the heart muscle. Anemia, thyrotoxin, congenital syphilis, tuberculosis, and endocarditis, as well as pericarditis, attack the structural and functional usefulness of the heart muscle. In fact, all specific, infectious and contagious diseases, and all chronic foci of infection, affect the cardiac musculature. In later life, arteriosclerosis, chronic metabolic diseases, and physical and mental overwork cause myocardial degeneration.

The effect on the myocardium may be inflammatory or degenerative, according as it is caused by bacteria or by toxins. The changes in the heart muscle may vary from simple to purulent myocarditis to various kinds of degeneration and fragmentation. Either the parenchyma or the interstitial tissue may be mainly affected.

Endocarditis, myocarditis, and myatonia cordis are the principal intracardiac disorders. In endocarditis the disease attacks the inner part of the heart and the valves are secondarily affected. In myocarditis the muscle tissue is diseased, while in myatonia cordis there is no cardiac lesion but a lack of cardiac tonus. Murmurs are usually present in all these cardiac disorders. Endocardial murmurs are loud, forcible and spreading. Myocardial murmurs are soft, weak, and limited. In atonia cordis or myatonia cordis there is a blowing systolic murmur in a heart of normal dimensions, and in a patient who does not complain of cardiac trouble. The murmur is usually found in the course of a routine physical examination.

One of the fundamental, physiological properties of muscle tissue and one of the principal functions of cardiac muscle is tonicity. A lack of muscle tonus causes a relaxation of the entire heart and a weakening of the valves. With each impact of blood during systole, the weakened valves vibrate and give rise to a systolic murmur. Such a condition may properly be called atonia cordis or myatonia cordis and the murmur may be called myatonic murmur. Febrile conditions, cardiac fatigue, anemia, malnutrition, improper cardiac innervation and hypoadrenia may produce a cardiac murmur either by causing a temporary myocardial hypotonia or by acting on a heart of poor muscular tonicity.

Myatonia cordis is probably the cause of that indefinite group of murmurs which are known as accidental, inorganic, hemic or functional. Since these terms are applied carelessly and interchangeably and without an exact anatomical or physiological basis, the term myatonic murmur, to take the place of the miscellaneous names, would be more appropriate. It would at once suggest an anatomical basis and a physiological dysfunction, for a murmur which probably has only one origin and many names.

The diagnosis of myocarditis in children is especially difficult, because of the diagnostic importance of the subjective symptoms in myocardial disorders, which a young child cannot intelligently express. Acute myocarditis in the course of some specific infectious disease may be diagnosed when there is an obscure sudden increase in temperature in a child that looks unusually pale, cyanotic, and distressed. He cannot bear the ordinary exertions and complains of precordial oppression. The heart is weak, slightly enlarged, and there may be a toneless systolic murmur at the apex. The extremities are cold and the pulse is empty, rapid and unsteady.

Subacute and chronic myocarditis can be diagnosed when there is a history of scarlet fever, typhoid fever, influenza or whooping cough in a child who complains of shortness of breath, heaviness, palpitation or pain in the cardiac region. He is disinclined to play and is easily tired on exertion. There may be digestive or respiratory disturbances and a trace of albumin in the urine. On examination, the child looks worn out, pale, or slightly cyanotic. The heart is usually enlarged, the sounds lack the normal muscular vigor, and there is a soft systolic murmur at the apex, and occasionally a reduplication of the second sound. The peripheral circulation is poor and the pulse is slow or irregular.

The treatment of myocarditis in children consists mainly in lessening or removing the general or focal infection, which injures the myocardium, and in prolonged rest. A great deal of physical and mental quiet should be enforced during and after all infectious diseases. The tired heart needs rest and judicious feeding for its recuperative power. During the acute stage of myocardial injury, codeine or morphine in small doses quiets the patient and conserves cardiac energy. In chronic cases, the underlying cause should be removed. Good food, fresh air and iron, arsenic, and strychnine will restore cardiac strength. Digitalis should be given when there is any evidence that the heart cannot do its work. Graded exercises are beneficial. Many obscure, chronic, circulatory, respiratory and intestinal diseases are cured by restoring a weakened myocardium to its normal strength.

Myocarditis in children is quite common and is just as commonly overlooked. A child with a history of diphtheria, pneumonia, scarlet fever, typhoid fever, influenza, or whooping cough is a potential myocardiac. Subjective symptoms of cardiac fatigue and objective signs of a slightly enlarged heart, a soft systolic murmur, of a quality peculiarly myocardial, and a pulse with some abnormality in rate, rhythm, volume or tension, makes the diagnosis. Proper timely care will save many a heart from an ultimate breakdown.

213 East Broadway.

Diagnostic Points in Diphtheria

By ARTHUR I. BLAU, M.D.,
New York.

The cases of diphtheria most commonly encountered are characterized by manifestations of varying description. This applies particularly to the pharyngeal and nasal forms of the disease.

A typical textbook pharyngeal diphtheria is relatively infrequent. Its signs and symptoms are sufficiently pathognomonic as a group to make a diagnosis easy. One can be reasonably certain of the correctness of diagnosis in a case of more or less sudden onset, in which there are sore throat, fever of 102° F., glandular enlargement at the angles of the jaw, general malaise, and a firm greyish white pseudomembranous exudate on the tonsils, and possibly also on the pillars, palate, or uvula. The cases ordinarily met, however, do not present so distinctive a picture, at least not at an early stage of the disease. Little or no constitutional symptoms are present in many cases, with but a slight elevation of temperature, and a small membranous patch on one or both tonsils, or on other parts of the pharynx; or the membrane may appear in small, firm, creamy white spots, which eventually coalesce.

Yet in most cases, if not all, these various anomalous though common forms, one or more of the signs and symptoms are sufficiently suggestive to put us on the right track, and then it is equally the characteristics and the presence of certain signs or symptoms which are suggestive in the diagnosis. The mere presence of a sore throat in a child is suspicious, especially so if its duration has been two or three days or more, and a culture should at once be taken. If in addition there is a slight elevation of temperature, say no higher than 101°, the suspicion becomes more suggestive. Not rarely the culture at this stage is found positive, though there is no exudate in the throat, and the further progress of the disease can be arrested by the prompt administration of antitoxin. If upon examination of the throat we discover a faint rim of a whitish film on one or both tonsils, or on the borders of the soft palate or uvula, we can be fairly certain that we are dealing with a diphtheritic membrane in its incipiency. A culture should no longer be delayed, for we can still arrest the full development of the disease by instituting the proper treatment. If the patient is not seen at this stage, or if the proper treatment has not been carried out, the further progress of the disease will make the diagnosis an easy matter.

Pharyngeal diphtheria is most often mistaken for follicular tonsillitis, and vice versa. Yet by carefully analyzing the signs and symptoms, we can avoid many pitfalls. A low fever, sore throat, and an exudate in the throat, are more suggestive of diphtheria than of tonsillitis. Diphtheria is characterized generally by a more quiescent onset, whereas tonsillitis by a more sudden onset, with high fever, i. e., 103° to 105°, and a greater degree of general malaise and prostration. The exudate in the former is usually in one continuous patch, or if in spots, they eventually coalesce. With the injection of antitoxin, intensification of the membrane is arrested within twelve hours. In tonsillitis the exudate is not really a membrane, but a cheesy mucous deposit, occurring in isolated spots in the tonsillar follicles, and can easily be removed without causing a surface bleeding. The white membranelike layer which covers the tonsils in some cases of tonsillitis, is not a membrane in reality, but a mucous mass easily removable. The early follicular exudation, unlike the early diphtheritic exudation, intensifies in its development for from twenty-four to thirty-six hours, in spite of treatment.

To summarize, the salient points in the diagnosis of pharyngeal diphtheria are the quiescence of the early constitutional manifestations (barring the more serious forms), and the nature of the exudate.

No definite membranous formation is usually present in nasal diphtheria, differing in this important respect from the pharyngeal type of the disease; nor are there generally any constitutional symptoms. This is the reason why nasal diphtheria is so commonly overlooked, and is often discovered accidentally or intentionally by bacteriological examination of the nasal discharge. In most instances, the only thing present is a persistent nasal discharge, occasionally blood tinged, and possibly also, but much less frequently, attacks of nasal bleeding.

The salient diagnostic point in nasal diphtheria is, therefore, a chronic nasal discharge, frequently bloody. Such discharges in infants and children should always arouse suspicion, and should be followed up with prompt cultural examination.

Laryngeal diphtheria is similar to the nasal form of the disease, in so far as its diagnosis does not depend upon the finding of a pseudomembrane. It is most often confused with spasmodic croup and catarrhal laryngitis or vice versa. It is important to bear in mind that at the onset the three conditions may be quite similar and therefore indistinguishable. However, it is not so much the onset as the progressive character of the membranous laryngitis, which differentiates it from other laryngeal forms.

Generally, the symptoms and signs at the onset of the membranous form are milder than in the other two. There is in all, hoarseness, croupy cough, stridor, dyspnea, and fever, of varying intensity. The fever in the membranous variety is usually low at onset, about 100° to 101°, a little higher in the catarrhal, and lower or absent in the spasmodic before the paroxysm. Of more importance in the early diagnosis is the general condition of the patient. In the catarrhal and spasmodic forms, the child is evidently not very sick and does not appear to be, and is inclined to continue at his play; in the diphtheritic form, on the other hand, there is early apathy, and the child appears to be sicker than the evident manifestations would warrant. Then again, while similar obstructive symptoms may be present in all forms of laryngitis, they differ in the manner of their occurrence, which is of distinct assistance in the diagnosis. In the membranous type the symptoms and signs are continuous, and, what's more, progressive, and after a duration of from eight to twelve hours all of them are greatly intensified. In the other forms the symptoms and signs are remittent and spasmodic, particularly in catarrhal croup, with a period of recession of symptoms of varying duration and degree. There are hoarseness and loss of voice in all, but the aphonia is usually only partial in the catarrhal forms, whereas it is complete in the membranous. Dyspnea and recession of the chest, with stridor, are also present in all, but in different degrees. In the membranous type these signs become extremely pronounced in a short time, with pallor of the lips and cyanotic finger tips. It is different in the laryngitis simplex varieties. The dyspnea, while quite marked during the paroxysm, is absent or slight in the interim, and the recession of the chest is only mild, even during the attacks.

The diagnostic points of membranous laryngitis are, therefore, early prostration and the progressive character of the disease.

It is to be borne in mind that the diagnosis of one of the types of diphtheria is facilitated by the presence of one or both of the other types of the disease. Again, a positive cultural examination will definitely prove the existence of diphtheria. Bacteriological findings are especially conclusive in the pharyngeal and nasal forms of the disease; in the laryngeal forms, on account of the impractibility or impossibility of reaching the seat of the disease, the findings are not conclusive if negative. Whenever there is the faintest suspicion of the existence of diphtheria, cultures should be taken, and it is even wise to do so in all inflammatory conditions of the throat occurring in children.

348 EAST EIGHTY-FOURTH STREET.

Spasmophilia*

By SAMUEL A. BLAUNER, M.D.,
New York,
Associate Pediatrist, Lebanon Hospital.

Spasmophilia is distinctly a disease of infancy and early childhood. Its manifestations take on varied forms, and frequently its symptoms are entirely latent, when its presence can be readily proved by Erb's electrical reaction. But whether latent or active its principal importance lies in the fact that convulsions, such a common disorder of childhood, are one of its principal and most common symptoms. Heretofore we were wont to look on convulsions in early childhood, whether idiopathic or occurring with the onset of acute febrile conditions, as of no great significance; in fact, the beginning convulsions in the acute febrile conditions were considered symptoms of the acute condition itself; but now, with our knowledge of spasmophilia, we know that in the majority of instances the convulsions are an expression of a tetanoid condition which has been made manifest or active by an intercurrent disease, and as such must be considered of importance as not infrequently they lead to a fatal termination.

Spasmophilia is really a hyperirritability of the peripheral motor nerves of the central nervous system and occurs in early childhood between the ages of three months and five years, rarely occurring beyond these limits. It is a disease of all strata of society attacking the well to do as well as the poor, the well nourished as well as the undernourished, although it is more common in infants surrounded by poor hygienic conditions, and on that account is frequently associated with rickets. Rickets, on the other hand, must not be confused with spasmophilia, for it is well established that they are entirely two different conditions, as it has been shown conclusively that not only are the blood chemistries entirely dissimilar but the pathology and symptomatology are entirely different. While not infrequently one encounters spasmophilic babies who are well fed, bright, happy and of good color and with no signs of rickets, on the other hand we find rhachitic babies who, if there were identical conditions, would show some of the pathognomonic signs of spasmophilia. As both these diseases are metabolic conditions dependent on the disproportion of the various mineral elements in the blood, they will of necessity be more or less concurrent, but it is well to remember that they possess entirely different pathology and symptomatology and for that matter require an entirely different therapeusis. In the presence of the serious symptoms of convulsions it would be a mistake to look upon spasmophilia as an expression of rickets and expose the child to the acute dangers of spasmophilia when its therapeusis is not only entirely curative but entirely different from that of rickets.

Spasmophilia, as has been said, is a hyperirritability of the peripheral motor nerves and as a result all the symptoms are motor in character. Spasmophilia, however, may be entirely latent, active symptoms being entirely absent, its presence being detected by the elicitation of the various pathognomonic symptoms, especially the Erb's electrical reaction. On the other hand, the symptoms may be active from the beginning, in which case it possesses not only its own symptom complex but also those of the latent form, or, which is not unusually the case, the active form is ushered in with generalized convulsions, either idiopathic or as the result of an acute febrile disease. The principal symptoms of the inactive type are the Chvostek symptom, the Trousseau symptom, and electrical hyperirritability.

In private practice, where access to an electrical machine is not possible, the diagnosis of latent spasmophilia will depend entirely on the Chvostek and Trousseau symptoms. Unfortunately these symptoms are not always present, and when present the Trousseau, which is the more pathognomonic of the two is not always constant, and as a result the majority of latent cases will be overlooked and the present spasmophilia recognized only when the active stage is ushered in by convulsions. Perhaps these convulsions for the moment are not serious and no great importance is attached to them, but it is well to remember that at some other time, especially when they occur at the onset of an intercurrent disease, they may be most severe and trying, terminating not infrequently in death. When we realize we are in the presence of an absolutely curable condition, which as a result of our oversight makes the intercurrent condition more difficult to handle, we will be impressed with the importance of examining every child under five years of age for latent Chvostek and Trousseau symptoms, and if possible the electrical reaction.

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The Chvostek symptom is not pathognomonic but is the more constant of the two, and consists of a contraction of the orbicularis palpebrum when the facial nerve is tapped just in front of the ear. The degree of contraction will depend upon the degree of the spasmophilia and in the more active cases a slight tapping of the facial nerve will throw many of the facial muscles into contraction. The Trousseau symptom, on the other hand, is an artificial tetany of the hand produced by pressure ischemia and is best obtained by pressing the bracial artery for a few moments just above the cubital fossa. The Trousseau symptom is not very constant but when present is especially pathognomonic of spasmophilia.

Of high diagnostic importance is the reaction of the peripheral motor nerves to the galvanic electrical current. The entire symptomatology of spasmophilia is dependent upon this irritability of the motor nerves and as a consequence the galvanic current will call forth a response different from the normal. Ordinarily with normal children the muscular contraction consequent upon peripheral nerve stimulation is more or less constant, that is, a contraction will begin to occur only when a certain milliamperage is obtained, but in spasmophilia it has been found that a much weaker current is necessary for a contraction to occur, due of course to the hyperirritability of the nervous system. Unlike the Chvostek and the Trousseau symptoms this symptom is constant and absolutely pathognomonic and is present in both active and latent cases. What makes this symptom still more important is the fact that this hypersensitiveness to reaction diminishes as the case improves and is gone with the cure of the condition.

Thiemich and Mann, of Germany, who have studied the question of electrical reaction in spasmophilia, with a view of obtaining a definite pathognomonic milliamperage figure in spasmophilia, found that of the various combinations that can be made, such as anodal closing contraction, cathodal closing contraction, anodal opening contraction, and cathodal opening contraction, for practical purposes cathodal opening contraction alone should be used for diagnostic purposes, and they therefore have formulated the rule that all cathodal opening contractions under five ma. are to be considered spasmophilic. Another interesting feature of the electrical reaction is the character of the response. In normal cases the electrical response is quick and sharp, while in spasmophilic cases it is slow and sluggish.

The active symptoms of spasmophilia are few and variable and depend entirely on the degree of activity of the conditions, the laryngismus stridulus being the most common, convulsions next in frequency, and general rigidity least common of all.

The stridulus is a distinct inspiratory crowing sound heard only in inspiration and is unaccompanied by any pathological change in the larynx. This crowing sound may be short or long, and in severer cases may be present with every inspiration or may be called forth only by deep inspiration or crying or when the child is in a temper. The expiratory phase of respiration is entirely normal and is of importance because of the aid in the differential diagnosis of other laryngeal conditions. There is also a congenital stridulus, not very infrequent, which stimulates spasmophilic stridulus very closely, but its onset at birth helps in the differentiation. Besides this congenital condition there are instances of congenital lues which give you a stridulus, but the early onset and other general symptoms will help in the diagnosis.

The importance of spasmophilia lies in the fact that convulsions are a prominent symptom and from observations and studies it is not amiss to say that the majority of idiopathic convulsions in children under five years of age are spasmophilic in character. Furthermore, it is also safe to say that in many instances the convulsions which usher in an acute febrile condition are spasmophilic in character. When it will be realized that spasmophilic convulsions can become very severe, especially with the onset of an acute infectious disease, and at times become fatal, and furthermore that these convulsions are the first warning of a previous latent spasmophilia which was easily amenable to treatment, we will understand the importance of looking for early or latent symptoms of spasmophilia in childhood.

The tetany or tetanoid contractions are late symptoms, and before spasmophilia became a recognized condition a rather common symptom, but now with early recognition and treatment is very rarely seen except in debilitated infants. Occasionally the tetanoid contraction involves the entire musculature, especially the muscles of the neck and back, giving rise to a marked opisthotonus and simulating very closely a basilar meningitis.

The diagnosis of spasmophilia is as a rule very simple if only the possibility of this condition is kept in mind. In active cases recognition is very easy, for in no other condition is a Trousseau, Chvostek and stridulus so pathognomonic, particularly in the presence of a previous history of idiopathic convulsions. Where there is access to the galvanic current the cathodal opening contraction surely will dispel any doubt. Where, however, the disease has been latent and the active condition is ushered in by convulsions either with or without elevation of temperature, diagnosis may be somewhat more difficult and if the Chvostek and Trousseau reactions are absent, the cathodal opening contraction alone will be of positive service. Sometimes in late neglected cases where the spasmophilia assumes the form of a general tetany, with marked opisthotonus suggesting a cerebral condition; or in early infancy before the third month in the socalled hypertonic infant where there is a general rigidity with a certain degree of opisthotonus, the diagnosis of spasmophilia may be somewhat difficult but the general history, age, the absence of the cardinal symptoms and especially the absence of the quantitative cathodal opening contraction, electrical reaction will readily differentiate the conditions.

Various have been the causes given for spasmophilia. Clinically the fact is well known that the majority of the patients are bottle fed and investigators have found that the elimination of cow's milk quickly relieves the condition. They found, too, that the calcium salts are decreased in the system and very recently Marriot and Howland have shown that the characteristic blood found in all cases of spasmophilia showed a marked reduction in the calcium salts and as the condition improved or was cured the calcium salts tended to return to normal. There can be no doubt that this deficiency of the calcium salts is the cause of the hyperirritability of the central nervous system, but even this must be secondary to some as yet unknown primary factor, for there surely must be a sufficient calcium salt intake in bottlefed babies.

The treatment, therefore, becomes a simple matter, by either putting the child on a diet free from cow's milk or giving some form of calcium, or for that matter both. In general, it is better to give the cow's milk free diet for it is more efficacious and more prompt, where the age of the child permits of such a change. In either case positive results will be obtained, but treatment must be continued long enough until all symptoms have disappeared, particularly the quantitive cathodal opening contraction, for otherwise recurrence will follow, and recurrence is not uncommon in spasmophilia.

1323 Madison Avenue.

Theory and Practice of Artificial Infant Feeding*

By S. HORWITT, M.D.,
New York,
Attending Physician, Vanderbilt Clinic, Department of Pediatrics; Assistant Physician, Mt. Sinai Dispensary, Department of Pediatrics.

We are all familiar with the dangers that menace the career of the artificially fed infant. Rickets, scurvy, tetany, gastrointestinal disorders, acute intoxications, anemia, marasmus, nutritional edema, reduced immunity and resistance in the face of infections—such are the morbid states which affect the bottlefed infant. Nevertheless, if artificial feeding is an evil, it is a necessary one, and it is our task next to discouraging it where possible, to render it safe for infancy where unavoidable. It is clear that the principles governing our efforts in this direction must be based on our conception of the factors that render artificial feeding in general and cow's milk in particular so hazardous for the human infant. I shall try, therefore, to pass in brief review some of the important doctrines that held sway over medical opinion on this subject ever since it began to be studied scientifically, commenting on them as I proceed.

After the chemical composition of both cow's and human milk had been learned and the differences noted, the remedy was sought in the correction of these differences (1). By diluting cow's milk and adding sugar and cream, mixtures can be obtained which, as regards the percentage of fat, protein, and carbohydrate, approximate human milk. Such devices were rather optimistically styled "humanization." However, a dilution of cow's milk sufficient to reduce the aggregate of its protein to the human level still leaves its casein more than twice as high as it occurs in woman's milk, while dilutions high enough to make the casein equal in quantity to that of human milk are inadequate for infant feeding. It must be borne in mind that casein—or curd—indigestion was long regarded as the greatest difficulty of bottle feeding. To overcome this difficulty expedients were devised to prevent the formation of tough, massive, casein curds in the infant's stomach, such as the addition of lime water, cereal gruels, sodium citrate, and peptonization (2).

Some observers were inclined to incriminate the fat of cow's milk as the source of trouble. Its volatile fatty acids were said to irritate the infant's stomach. As a remedy it was proposed to skim the milk and for its cream substitute lard, cocoa butter, or olive oil.

In the light of our present knowledge we may say that an attempt to imitate human milk is an impossible task. The fat is qualitatively different, the salts are quantitatively different, and the protein is different in quantity as well as in quality. The percentage of casein is higher in cow's milk, and the casein coagulates differently. The precipitin test shows that the casein is biologically different from that of woman's milk (3). There are other biological differences, such as ferments and immune bodies which are specific in each milk for its species, and therefore useless for the alien species. We know, furthermore, that the nutritive value of proteins cannot be rated in terms of percentages. We now know that the nutritional value of proteins is determined by the kind and quantity of aminoacids in its molecule, and casein, containing less of these essential aminoacids than lactalbumin, must be consumed in larger amounts to insure proper growth (4). Here we have a biological explanation for the empirically observed fact that infants cannot be kept long on a formula in which the percentage of protein equals that of mother's milk. As to the use of such devices as sodium citrate or peptonization, it may be said that we are coming more and more to look with disfavor upon denaturing procedures, which are likely to impair the nutritional value of such a good food as cow's milk. These methods are likely to damage the antiscorbutic properties of the milk. The same may be said of the attempt to substitute lard, cocoa butter, or olive oil for cow's fat, as alluded to above. Nutritional experiments have shown that these are the worst possible fats to give a growing animal, as they are utterly devoid of vitamine A (5).

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After the chemists came the bacteriologists. In the enthusiasm following the discoveries of Pasteur, all troubles arising from artificial feeding were laid to infection (6). Milk is such a good culture medium and the chances for infection so numerous! The watchword then was: Sterilization! Budin declared that milk, provided it was boiled, could be fed unmodified. It soon became manifest, however, that while boiling could be depended upon to prevent the transmission of typhoid, tuberculosis, and dysentery, as well as certain other diseases definitely of infectious origin and which, by the way, are comparatively rare, it was no panacea for dyspeptic states, nutritional disorders, and the common diarrheas, such as are encountered in artificially fed infants. Asepticism therefore did not solve the problem.

The most promising method of ascertaining the cause of the disturbances accompanying artificial feeding would seem to be the study of the syndrome which is typical of cow's milk feeding and known on the Continent as cow's milk dyspepsia (*la dyspepsie du lait de vache*—Marfan) or milk injury (*milchnährschaden*—Czerny). This syndrome is characterized by arrested weight, emaciation, distressed countenance, constipation, pale grey, puttylike stools of alkaline reaction, which contain an abnormally high amount of calcium and other soaps—the socalled soap stools. There may be periods of diarrhea, when pale, fetid stools are evacuated. The urine contains an abnormal amount of ammonia. There seems to be an improper utilization of fat and an abnormal loss of alkalies (7). So much is clinical fact, as to which there is universal agreement. When, however, it comes to its interpretation, there is great diversity of opinion. Casein putrefaction with autointoxication; fat intolerance, demineralization of the body with consequent acidosis; failure of the biliary and pancreatic ferments; faulty correlation of the quantity of sugar to that of protein and fat which hinders physiological fermentation—such are some of the meanings read into this x of *milchnährschaden* (8).

On one point, however, there is agreement among all observers, namely, that the only corrective for the "soap stool" and the cure and prevention of the associated malnutrition, is an adequate allowance of carbohydrates. To this all important fact we shall have occasion to return later.

Next to the misconceptions concerning the infant's food are those relating to the infant. It is not within the scope of this paper to discuss the place of constitutional inferiority and the rôle of peculiar diatheses in infant feeding. Possibly some form of vomiting, diarrhea or dyspepsia may be a manifestation of a neuropathic diathesis. Nevertheless, when one remembers the number of vomiting, dyspeptic, fretful infants who become placid, contented, soundly sleeping babes as soon as their nutrition has been improved, one is inclined to think that the rôle of diathesis in the general run of infant feeding must be limited. A further error is the conception firmly rooted in the minds of some of the profession that infant feeding is essentially a problem of infantile digestion. The tendency is to lay failures to dyspepsia, gastroenteritis, fermentation, putrefaction, failure of digestive ferments, as though these were primary entities. As a matter of fact, the infant is provided with all the digestive ferments found in the adults (10). Fermentative and putrefactive processes, as well as their associated flora, are secondary to and contingent upon the mode of feeding (11). As to the term gastroenteritis it should be noted that postmortem examination of the digestive tract of infants suffering from malnutrition, dyspepsias and even severe, toxic diarrheas—barring of course the dysenteries—are negligible. Obviously, therefore, we must look for the explanation of the accidents of artificial feeding beyond the intestinal mucosa. The method of approach must be metabolic and nutritional, as well as digestive.

At this point it is pertinent to inquire under what circumstances, if at all, the "artificially fed" adult may suffer from disturbances analogous to those occurring in infancy as they were detailed at the outset of this paper. In normal times adults are strikingly free from them. In communities, however, subjected to siege, blockade, famine, camp and prison life, there appear individuals suffering from cachexia (marasmus), scurvy, rachitic bone lesions, nutritional edema (war edema), tetany, reduced immunity and resistance in the face of infection—in fine, the whole gamut of diseases which we are in the habit of associating with artificially fed infants. European medical literature since the armistice abounds in highly interesting, if painful, accounts of the nutritional experiments conducted under the auspices of Mars in a laboratory as vast as a large part of the Eastern hemisphere and with countless human beings instead of guineapigs. Beriberi among British soldiers in Mesopotamia as a result of using highly milled flour, scurvy among the Indian soldiers who would not eat fresh horseflesh (12), xerophthalmia among Danish children as a result of fat privation (13), cachexia and edema among the people of the Central Empire as a result of low caloric allowance and of fat and protein shortage (14, 15), late rickets in youths and osteomalacia in adults, as well as tetany as a consequence of inanition plus the debilitating effect of influenza in 1918-1919 (16, 17, 18). Here is a wealth of nutritional experiments upon humans with vitamine deficiencies, general inanition, fat and protein inanition, and inanition plus the debilitating factor of infectious disease.

These facts, it seems to me, should prove illuminating in our endeavor to unravel the essential fault of artificial infant feeding. Czerny and Keller's syndrome of *mehlnährschaden,* flour injury resulting from a onesided carbohydrate alimentation, was closely mimicked by war edema (14). As to the syndrome of milk injury, one could hardly expect its reproduction during the war as it presupposes a ration, sufficient in fat and protein and poor in carbohydrate, whereas in the event of blockade, protein and fatty foods give out long before the carbohydrate foods. Considering, however, its mode of origin, we find that it is most likely to occur when no sugar, or an insufficient amount, is given along with cow's milk. Marfan, who at one time was induced by the teaching of Budin to feed the infants under his care on unmodified milk, found that in the great majority of those under six months the syndrome of milk dyspepsia developed (19). Furthermore, as was pointed out above, the only corrective for this nutritional disturbance, as well as its prevention, is a proper carbohydrate allowance. From these considerations we may conclude with Finkelstein that the socalled milk injury syndrome is a product of carbohydrate inanition (20).

Viewed in this light, infant feeding becomes preeminently a problem of correct rationing of an individual who, like an inmate of a prison camp, is dependent upon the mercy, wisdom, or folly of others for the choice of his fare. The chances of error are greater in the case of the infant, because those in charge lack the helpful suggestions which instinct and appetite would give in planning a diet for an adult. The possibilities for harm, too, are so much greater in the case of the infant, for the reason that to the requirements of maintenance, which are much higher to the unit of weight than in the adult, there is superadded the imperative element of growth. The infant doubles his weight in six months, and trebles it in the first year. It can therefore be readily understood why nutritional diseases, which in the adult take years for their development, are in the infant precipitated in so many months or even weeks (27).

Now, mother's milk having been designed for the same species constitutes a well balanced ration in every way. It has an optimum of fats, proteins and carbohydrates, salts, vitamines, perhaps also hormones and immune bodies, so that the most primitive mother, provided her supply is ample and she is healthy, will succeed regardless of the technic she uses or abuses. If I may use a vulgarism, it is fool proof. Once the infant is taken off the breast, his nutritional fate lies between the Scylla of excessive, improper and contaminated food and the Charybdis of an insufficient, inadequate, devitalized or onesided diet. The first danger received ample attention in the past. In fact it was overemphasized, whereas the dangers of inanition received only scant passing notice. The tendency was to implicate this or that food element, instead of looking in the direction of a possible deficiency of one or of the other food requirement. Yet a critical survey of the histories of marantic infants seen in hospitals or dispensaries will disclose that, barring infectious diseases or organic defects, inanition general or specific, plays the largest etiological rôle.

EXAMPLES.

1. Infant, one month. For past two weeks fed on malted milk, one dram, water two and a half ounces, q. three hours. Extreme emaciation. Example of general inanition.

2. Infant, two and a half months, milk and water āā three ounces, q. three hours. "Vomits cheese. Emaciated. Sugar inanition. Also, because of excessive quantity, vomiting, and therefore general inanition.

3. Infant, five months. Milk and water āā four ounces, granulated sugar ʒi, q. three hours. "Soapstool." One pound underweight. Initial stage of "milk injury."

4. Infant, four months. Nursing unsuccessful and doctor advised barley water. Thereafter baby refused breast and was kept for three weeks on barley water. On admission weighed ten pounds, anemia, emaciation, skin feels tense, in parts glossy and scleremic. Here is an instance of *mehlnährschaden* of Czerny, a counterpart of war edema, due to general inanition with the particular deprivation of fat and protein.

5. Infant, six months. For three months on milk and water āā four ounces. Loss of weight. Emaciation. Carbohydrate starvation.

6. Infant, six months. On dried milk for two months. Gained at first. Recently, diarrhea, arrest of weight despite sufficiently high calories. Diagnosis—sugar insufficiency. When changed to whole milk formula plus a proper quantity of sugar, his weight and vitality made wonderful progress.

Naturally, not all feeding histories are clearcut. A number of deleterious forces may have been at work in a given case, simultaneously, and it may be impossible to determine the nature of the nutritional injury. Dyspepsia from overfeeding or improper food, deficiency of an important food element, avitaminoses, and infections may be combined in various degrees and superimposed in various combinations. The end result may be in one case rickets, in another von Jaksch's anemia, in a third an obscure form of marasmus, in a fourth celiac disease. We well know how difficult it is to explain these syndromes on the basis of a single and specific etiological cause. In fact, in the famine diseases mentioned above several factors were contributory. Starvation, partial inanition, hard work, cold, infectious diseases, avitaminoses. This broad, nutritional viewpoint will save us from therapeutic narrowness.

As a concluding remark it may be said that while chemistry, bacteriology and metabolic studies have contributed immensely to our knowledge of infant feeding, many of its problems can for the present be solved only by the direct nutritional method of investigation.

To summarize, then, the considerations upon which we are to base our principles and practice of infant feeding are as follows: Imitation of human milk is an impossible task, and should therefore not be a determining factor. Imitation is only possible in the case of sugar, and even here the superiority of lactose over other sugars has not been demonstrated. Curd indigestion is largely a misconception, and its correction is rarely called for. At our clinic we almost never see occasion to treat it or even to take it into account. We have long since proscribed lime water, sodium citrate, peptonization. The use of sterilized or aseptic milk will not expiate the sins of an improper formula. The fear and trepidation with which the use of plain cow's milk is approached by the uninitiated is unfounded. Probably a good many of the failures attributed to cow's milk as a whole or to any of its particular constituents were in reality due to lack of knowledge and appreciation of the nutritional needs of the growing infant. By the same token one must guard against misinterpreting such symptoms as loss of weight, restlessness, vomiting, diarrhea. They do not invariably imply overfeeding, food intolerance, curd indigestion, nor do they spell higher dilution, predigestion, reducing this or that food constituent. One should palliate these symptoms while treating the underlying nutritional fault. In fact, we have seen vomiting and diarrhea clear up under an adequate formula.

As to the attributes of an adequate formula: 1. It must contain sufficient calories. 2. The calories must be properly apportioned between fat, carbohydrates, and proteins. 3. The food allowance must not be excessive. 4. The volumetric quantity must be right—neither too small nor too great. 5. It must not be destitute of growth promoting principles, or vitamines, either through denaturing processes, substitution, or onesidedness.

1. *Calories.*—The name caloric feeding is objectionable, inasmuch as it lays too much emphasis on the caloric aspect of the food as though its composition were a matter of indifference. The specific value of food constituents, quite apart from their caloric value, and in fact even in the absence of any caloric import, as in the case of vitamines, has been discussed above. In the case of fat, however, we may assert that while it may have a definite rôle in nutrition and metabolism, even apart from being a purveyor of vitamine A (21), its quantitative requirement seems to be elastic, and within certain limits it may be replaced by sugar. The use of whole milk mixtures has stood the test of time, and it must be realized that in these mixtures the fat percentage is necessarily lower than in woman's milk. In fact, the use of whole milk mixtures was originally justified on the theory of isodynamy or caloric equivalence of foods (22). We may also point to the use of skimmed milk or buttermilk mixtures with apparent good results as examples of low fat feeding.

With these reservations in mind we will find the caloric appraisal of food one of the helpful criteria of a good formula. The figure usually given is forty-five calories to the pound for the first nine months, forty for the balance of the first year; overweight, quiet babies will do well on less, and puny, undernourished ones will require fifty to sixty or more.

2. *Fats, proteins, and carbohydrates.*—While it is still convenient to compute the quantities of these in terms of percentages, it is obvious that what really matters is the absolute quantity of each food principle. Accordingly, the protein requirement is said to be covered by the use of an amount of milk equal to one tenth of the infant's body weight, or one ounce and a half to the pound. The sugar need is given as one one hundredth of the body weight (22) or about one and a quarter dram to the pound. The fat requirement is generally met alongside of the protein allowance. Low fat and high sugar combinations are compatible with good growth and development. In fact, skimmed milk and high sugar combinations have proved very useful in our hands during the period of reparation in cases of denutrition (22). Possibly sugar is more readily utilized by the debilitated infant than is fat. Also the high protein may be of advantage because in the reparative stage of inanition protein retention is higher than normal (28). Nevertheless, to avert possible harm from a prolonged fat poor regimen, we skim less and less as the baby improves, until whole milk is reached. Exceptionally, top milk mixtures will apparently save the day, and we may surmise, although this cannot be definitely affirmed, that in these instances there is a higher nutritional need of fat than ordinarily.

3. *Hyperalimentation.*—This leads to dyspepsia. For a time the infant may do uncommonly well, its weekly gain may reach three quarters to one pound. Sooner or later anorexia, vomiting and diarrhea supervene. If long persisted in, it eventuates in denutrition and occasionally in the symptom complex of acute intoxication (cholera infantum).

4. The volumetric quantity of the formula, which is after all a question of covering the water needs of the body, may be given roughly as follows:

Three ounces to the pound during the first four months.
Two and one half ounces to the pound during the second four months.
Two ounces to the pound during the third four months.

It is rarely necessary to go much above forty ounces a day. When the volume of the food is excessive, part of it may be vomited or refused, partial inanition resulting in either case.

5. As to vitamines and the socalled growth promoting factors, orange juice should be given routinely as a convenient vehicle of both C and B factors (24). Vitamine A is supplied in the fat of the milk. After the eighth month small quantities of finely mashed vegetables, and, when indicated, also yolk of egg, which, in addition to vitamine A, also contains iron. The objection to these foods at this early age proceeded from the traditional distrust of the infant's digestive apparatus.

Undernourished infants require more food than normal ones of the same weight. For these the figures lie somewhere between those called for by their actual weight and the weight that would be considered normal. Actually, the optimum amount is arrived at by allowing less at first and then increasing until the gain is satisfactory.

A careful history and physical examination are the *sine qua non* of intelligent infant feeding. The presence of syphilis, tuberculosis, cerebral defect, cretinism, congenital heart disease, pyloric stenosis, or an acute infectious disease like grippe, pyelitis, otitis media, for example, will impede the infant's growth even when the feeding is ideally planned. Where there is no fundamental disease, one analyzes minutely and critically the feeding history in the light of the criteria detailed above. One aims to make a correct digestive as well as nutritional diagnosis and to correct or overcorrect the apparent fault of the preceding formula. One must be careful in the interpretation of such symptoms as restlessness, crying, vomiting, diarrhea, for they may be occasioned by either excessive or insufficient alimentation. Or, their cause may be parenteral, as, for example, grippe, otitis media. Having made up one's mind as to the formula indicated, one gives at first somewhat less than full strength. In fact, where the history indicates superalimentation, with poor appetite, the infant leaving part of each feeding, a temporary régimé of underfeeding, both caloric and quantitative with lengthened spacings, is indicated, to cure the gastric atony. But even where the trouble seems to be one of subalimentation, the first formula must be in the nature of an experiment. Nevertheless, one must have the courage of his convictions, and proceed boldly enough to get results.

ILLUSTRATIONS.

A. Infant, twelve pounds, three months:

Total quantity, 12x3 oz.=36 oz.
Milk, 12x1½ oz.=18 oz.
Sugar, 12x1 dr.=1½ oz. (or 12x1¼ dr.=2 oz.)
Water, 36—18=18 oz.
Calories per lb. (18x20)+(1½x120)=540; 540÷12=45 (or 50).
Directions: 5 oz. q 3 hrs. 7 feedings in 24 hrs.

B. Infant on breast until present. Imperative reason for weaning: serious illness or death of mother. First formula should be about two thirds of A:

Milk	12 ounces
Sugar	1 ounce
Water	24 ounces
Total	36 ounces

Calories, 30 per lb.

Directions: 4 to 5 oz. q. 3 hrs. Increase gradually until formula A is reached.

C. Previous formula excessive—calories much too high, quantity too large, perhaps high fat. Recently stopped gaining, takes only two or three ounces of the six to eight ounces offered. Some belching and regurgitation.

Directions: Water diet for the rest of the day. Next day give formula B, giving rather four than five ounces every three or, better still, every four hours, to cure dyspepsia, until appetite has improved. Then increase until formula A is reached.

D. Child is five months old, two or three pounds underweight. History of (a) injudicious feeding: quantity too large, seven or eight ounces at a time, fed whenever it cried, perhaps every two hours. Occasionally "gets a crust of bread," etc. Proceed as in C. When symptoms ameliorate, the quantities given in formula A should be exceeded, as underweight children must have greater food allowance than normal ones of same weight.

(b) Subalimentation. Appetite good. Quantity too low or sugar too low. Begin with formula A and rapidly advance, bearing in mind the quantities this infant's age would entitle him to. It is in cases grouped under D that the use of skimmed-milk-high sugar often yields gratifying results. The first formula for cases given in (b) may be like this:

Skimmed milk (1% Fat) 24 oz. 24x12.5=300
Water, 12 oz.
Sugar, 2 oz. 2x120=240
Total, 36 oz.
Calories, Total (1 oz. 1% Milk=12.5 cal.) 540
Calories per lb. 540 12=45
Directions: 6 oz. q 3 hrs., 6 feedings.

If all is well at next visit, increase the amount of milk or of sugar or both. The use of two sugars, as saccharose and dextrimaltose, for example, works well. Later on use two per cent., three per cent., four per cent. milk.

E. Baby still on breast but gain is arrested or precarious. Use complementary feedings. First formula is something like this:

Milk	7 ounces
Water	14 ounces
Granulated sugar	1 ounce
Total	21 ounces

Directions: Feed 2-3 oz. after each breast nursing.

F. Baby fifteen months old. Weighs seventeen pounds. Somewhat anemic. Perhaps stigmata of rachitis. History: Feedings irregular. Eats everything at the table in addition to one to one and a half quarts of milk. History of colds, coughs, rhinitis, etc. Recently anorexia. Daily calories above one thousand. Or, in some cases, takes one to one and a half quarts of milk and cares for little else. Here a radical reform in diet must be insisted. In the first instance underfeeding must be practised for a short period, milk reduced to twenty-four ounces, cereal one to two tablespoonfuls twice a day, one to two pieces of toast, orange juice. Calories reduced to six hundred or seven hundred. Number of meals reduced to four or five. Subsequently vegetables were introduced, apple sauce, prune juice, egg, perhaps codliver oil and iron. In the second instance one aimed at the same dietary as above. Firm dietary discipline as well as patient perseverance and training is necessary to reform the infant's morbid idiosyncrasies.

The above outlines are meant to be suggestive, and no rigid dogmatism is intended. The treatment of infants considerably underweight with severe nutritional disturbance, of acute gastrointestinal attacks with fever and perhaps intoxication is not within the purview of this paper. Cases of anaphylactic intolerance for cow's milk or for eggs are not considered.

Needless to say, figures in connection with infant feeding represent only averages, from which departures may be and often are indicated in individual cases. In fact, the ability to individualize is the distinguishing mark of the consummate infant feeder. The memorization of a few rules will not make an accomplished feeder, any more than it will make a finished radiologist or surgeon. Difficult, long neglected cases will tax the ingenuity of even the expert, while the treatment of advanced marasmus or decomposition (Finkelstein) is always trying and frequently disappointing. In these cases a stage has been reached where there is no mere arrest of growth to be resumed with improved opportunity. Here the cellular structure has suffered irreparable injury or decomposition. The withered organism has lost its capacity for reparation, even woman's milk avails nothing. It may be hoped, however, that with the application of the principles and rules laid down above, the occurrence of nutritional disasters will be averted. The further significance of rules and figures is their implication. If the nutritional requirements will be borne in mind and attended to, patent foods and stereotyped formulas will be found unnecessary and the claims made for them hollow. I believe that the skillful use of cow's milk has enough possibilities to meet almost every feeding emergency of the infant, that the less it is tampered with the higher its nutritional value. I consider the invention of new foods as ingenuity applied in the wrong direction. I think that the profusion of foods leads to the confusion of the feeder. I can only explain the vogue of newfangled infant foods by a human failing which was so well expressed by James Lind in 1755 in his treatise on scurvy (25). He says: "Some persons . . . would have more faith in some elaborate composition, dignified with the pompous title of Antiscrobutic Golden Elixir, or the like, than in the use of fruits and vegetables."

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806 EAST 175TH STREET.

A complete list of references will appear in the author's reprints.

Infant Feeding

By ALBERT E. MUCKLOW, M.D.,
Brooklyn, N. Y.

The desire to present a simple, flexible, yet scientific method of infant feeding prompts this contribution.

We have, for consideration, vitamines, sugar, fat, and proteins; the means for increasing or decreasing any one of these independently of the rest; and the indications for making such variations in their amounts. The thermostabile vitamines are supplied in the milk. The thermolabile antiscorbutic vitamine is supplied in orange juice. The orange juice is started any time, after the first two weeks of age, that artificial feeding is begun and is given in amounts of one teaspoonful daily the first three days, two teaspoonfuls daily the second three days, and so on up to twelve teaspoonfuls (four tablespoonfuls) daily, in which amount it is continued. This supplies a trifle more than Hess's (1) irreducible minimum of an ounce and a half daily, needed to prevent scurvy when boiled or pasteurized milk is used. The advance is made more gradually if gastric intolerance occurs. This is unlikely, especially if only a small portion of the daily amount is dropped upon the tongue every few hours, either between or before the feedings.

Sugar is used in the form of a neutral malt extract. Sugar tolerance is acquired by giving one level teaspoonful of the malt extract daily the first three days, two level teaspoonfuls daily the second three days, and so on up to nine level teaspoonfuls (three level tablespoonfuls) daily, in which amount it is continued. This, according to Dennett (2), is the maximum amount needed. Watch is kept for loose, acid smelling, excoriating stools (3), reducing the amount of malt if these occur. If a desire to economize prompts the use of cane sugar, it may be employed in like amounts.

Fat tolerance is developed by using milk from which have been removed the top eight dipperfuls (eight ounces) the first week, milk from which have been removed the top seven dipperfuls (seven ounces) the second week, and so on until whole milk is used. Watch is kept for soap stools or oily stools, reducing the amount of fat if these occur.

The amount of protein is varied by using a mixture of five sevenths milk and two sevenths diluent (water and malt combined), one of six sevenths milk and one seventh diluent, or undiluted milk. While gradually increasing the percentage of fat and sugar, a high percentage of protein is required. This, as Holt (4) has shown, is not only permissible but advantageous. The amount of protein required is indicated by the weight. A weekly gain of four ounces is desired. Starting with a mixture containing five sevenths milk, we continue with this as long as the infant shows the increase indicated above, subsequently advancing to a six sevenths milk mixture or to undiluted milk as required to maintain this weekly gain.

Ability to increase the protein without materially altering the fat, necessitates a knowledge of the approximate percentage of fat in whole milk and in the bottom milks after various amounts have been removed from the top, as well as a knowledge of the approximate percentage of fat in mixtures composed of six sevenths and five sevenths of these same whole and bottom milks.

Table I, copied from Chapin and Pisek (5), shows the percentage of fat in each of the top eight ounces of a quart bottleful of 4.1 per cent. fat milk, six or more hours after bottling.

TABLE I.—TOP MILKS

First ounce	25.0 per cent. fat
Second ounce	23.0 per cent. fat
Third ounce	19.0 per cent. fat
Fourth ounce	18.5 per cent. fat
Fifth ounce	10.5 per cent. fat
Sixth ounce	4.8 per cent. fat
Seventh ounce	3.4 per cent. fat
Eighth ounce	2.2 per cent. fat

Table II, computed from Table I, shows the percentage of fat in each of the bottom milks.

TABLE II.—BOTTOM MILKS

After removing top ounce	3.4 per cent. fat
After removing top two ounces	2.8 per cent. fat
After removing top three ounces	2.2 per cent. fat
After removing top four ounces	1.6 per cent. fat
After removing top five ounces	1.3 per cent. fat
After removing top six ounces	1.2 per cent. fat
After removing top seven ounces	1.1 per cent. fat
After removing top eight ounces	1.0 per cent. fat

The application of the preceding generalities to the accompanying formulas (Table III), is as follows: Start with a mixture of five sevenths milk skimmed of the top eight ounces. Increase the fat by advancing to a mixture of five sevenths milk skimmed of the top seven ounces the second week, then to a mixture of five sevenths milk skimmed of the top six ounces the third week, and so on. If soap stools or oily stools appear, retrace sufficiently to avoid them. Continue with the five sevenths milk mixtures as long as there is the desired gain in weight. When this ceases, change to a six sevenths milk mixture, selecting a formula with approximately the same percentage of fat as contained in the five sevenths milk formula just left. Continue with six sevenths milk mixtures, increasing the fat by the same weekly advance to a richer formula as when five sevenths milk was used. When again the proper gain in weight ceases, change to undiluted milk, choosing a formula with a fat content corresponding closely to that of the six sevenths milk formula just left. Continue with undiluted milk gradually increasing the fat by the same weekly advance as before, until whole milk is used. In this way flexibility is assured.

The directions to the mother or nurse for preparing and using a formula are: Take two quart bottles of milk which we will call bottle No. 1 and bottle No. 2. Skim off and discard from the top of each of these the number of dipperfuls (ounce dipperfuls) indicated in the given formula. Pour the remainder of bottle No. 1 into a pot with a capacity four times the amount of the formula. This leaves bottle No. 1 empty. Make the remainder of bottle No. 2 uniform by four pourings; that is, by pouring

TABLE III. FORMULAS

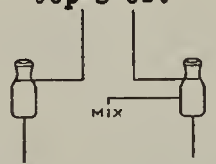
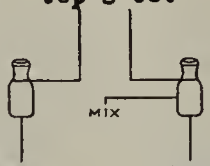
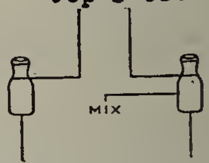
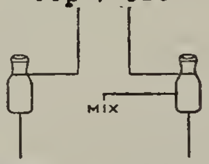
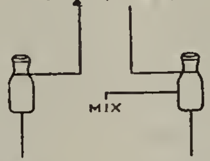
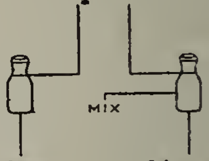
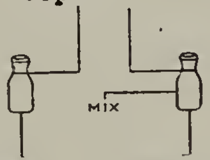
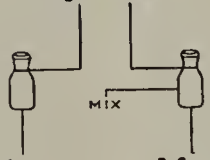
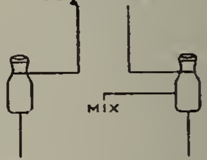
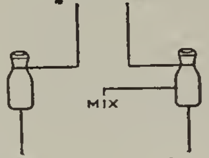
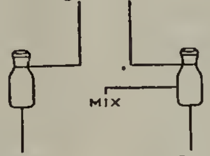
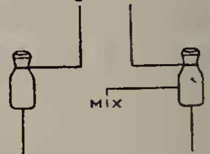
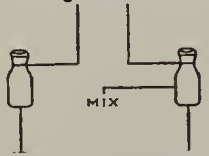
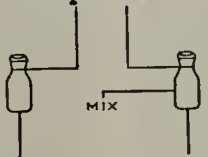
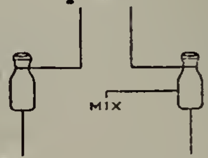
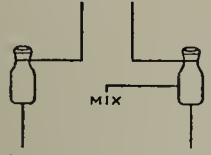
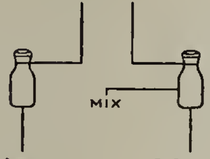
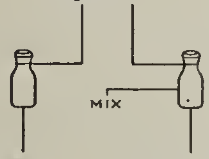
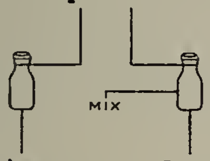
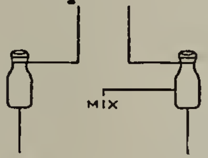
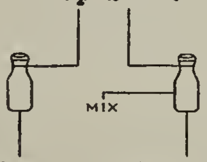
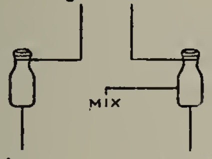
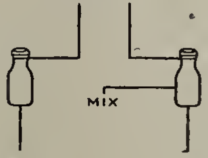
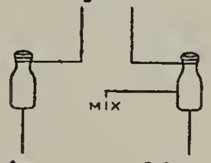
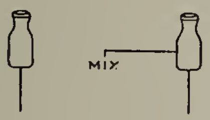
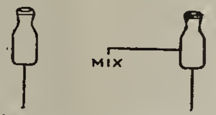
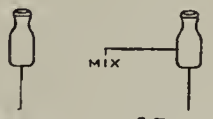
5/7 Skimmed of Fat Milk top 8 oz. 0.71%  All of this 11 oz. of this 14 oz. of (water and malt)	6/7 Skimmed of Fat Milk top 8 oz. 0.85%  All of this 18 oz. of this 7 oz. of (water and malt)	7/7 Skimmed of Fat Milk top 8 oz. 1.00%  All of this 25 oz. of this Malt
5/7 Skimmed of Fat Milk top 7 oz. 0.78%  All of this 10 oz. of this 14 oz. of (water and malt)	6/7 Skimmed of Fat Milk top 7 oz. 0.94%  All of this 17 oz. of this 7 oz. of (water and malt)	7/7 Skimmed of Fat Milk top 7 oz. 1.10%  All of this 24 oz. of this Malt
5/7 Skimmed of Fat Milk top 6 oz. 0.85%  All of this 9 oz. of this 14 oz. of (water and malt)	6/7 Skimmed of Fat Milk top 6 oz. 1.02%  All of this 16 oz. of this 7 oz. of (water and malt)	7/7 Skimmed of Fat Milk top 6 oz. 1.20%  All of this 23 oz. of this Malt
5/7 Skimmed of Fat Milk top 5 oz. 0.92%  All of this 8 oz. of this 14 oz. of (water and malt)	6/7 Skimmed of Fat Milk top 5 oz. 1.11%  All of this 15 oz. of this 7 oz. of (water and malt)	7/7 Skimmed of Fat Milk top 5 oz. 1.30%  All of this 22 oz. of this Malt
5/7 Skimmed of Fat Milk top 4 oz. 1.14%  All of this 7 oz. of this 14 oz. of (water and malt)	6/7 Skimmed of Fat Milk top 4 oz. 1.37%  All of this 14 oz. of this 7 oz. of (water and malt)	7/7 Skimmed of Fat Milk top 4 oz. 1.60%  All of this 21 oz. of this Malt

Table III (*Continued*)

5/7 Milk Skimmed of top 3 oz. Fat 1.57%  All of this 6 oz. of this 14 oz. of (water and malt)	6/7 Milk Skimmed of top 3 oz. Fat 1.88%  All of this 13 oz. of this 7 oz. of (water and malt)	7/7 Milk Skimmed of top 3 oz. Fat 2.20%  All of this 20 oz. of this Malt
5/7 Milk Skimmed of top 2 oz. Fat 2.00%  All of this 5 oz. of this 14 oz. of (water and malt)	6/7 Milk Skimmed of top 2 oz. Fat 2.40%  All of this 12 oz. of this 7 oz. of (water and malt)	7/7 Milk Skimmed of top 2 oz. Fat 2.80%  All of this 19 oz. of this Malt
5/7 Milk Skimmed of top 1 oz. Fat 2.42%  All of this 4 oz. of this 14 oz. of (water and malt)	6/7 Milk Skimmed of top 1 oz. Fat 2.91%  All of this 11 oz. of this 7 oz. of (water and malt)	7/7 Milk Skimmed of top 1 oz. Fat 3.40%  All of this 18 oz. of this Malt
5/7 Milk Whole Milk Fat 2.92%  All of this 3 oz. of this 14 oz. of (water and malt)	6/7 Milk Whole Milk Fat 3.51%  All of this 10 oz. of this 7 oz. of (water and malt)	7/7 Milk Whole Milk Fat 4.10%  All of this 17 oz. of this Malt

it into bottle No. 1, back into bottle No. 2, and again into bottle No. 1 and back into bottle No. 2. This procedure thoroughly mixes the milk, as observed by Dr. Harris Moak (6), of the Kings County Milk Commission. Now remove from bottle No. 2 the number of dipperfuls needed, as indicated in the given formula, and add them to the milk in the pot. Fill empty bottle No. 1 with water. Remove from this the number of dipperfuls of water needed and add them to the milk in the pot. Add the requisite amount of malt. Stir until the malt is dissolved. Bring this completed mixture to an active boil and allow it to boil for two minutes. Stir constantly during the entire time the milk is exposed to the heat to prevent burning and scum formation. Let cool. Pour into preserve jars and clamp down, or into nursing bottles and stopper. Stand jars or bottles in the ice chamber of a refrigerator between two cakes of ice. Feed every three hours, allowing the infant to judge the amount of each feeding. The usual rule is an ounce more than the age in months. Half an ounce more in the nursing bottle each time than the infant consumes assures a sufficiency with no danger of over feeding. Use a Chapin dipper to skim off the top milk, removing the first dipperful with a teaspoon to avoid overflowing. Before preparing the food, place the utensils in a large pot and boil them for five minutes, and then do not touch them until the hands have been thoroughly scrubbed with soap and water.

The formulas are all forty-nine ounce mixtures. Other multiples of seven, such as forty-two, thirty-five, or twenty-eight ounces, may be used when the infant requires only such amounts. However, an abundant supply is advisable to provide for the possibilities of a tardy milkman or breakage. If a larger mixture is made up than can be consumed in one day, a proportionately greater amount of malt should be added thereto so that the infant may obtain its daily quota.

Boiling the milk makes its casein sufficiently digestible for the average healthy infant. When the digestive and assimilative functions are at a low ebb, and intestinal putrefactive processes are present, milk fermented with Bulgarian bacilli is ideal. The flocculent curds produced are easily digested and assimilated, and the milk thus fermented is clinically both antiputrefactive and tonic to the gastrointestinal tract. According to Rettger and Cheplin (7), milk fermented with Bulgarian bacilli is not directly antiputrefactive but supplies a pabulum, namely, its contained lactose, acceptable to the bacillus acidophilus, by the multiplication of which the putrefactive bacteria are decreased. Sherman and Lohnes (8) believe that the lactic acid formed during fermentation stimulates the gastrointestinal innervation thereby restoring secretory and muscular tone. Compared with Bulgarian bacilli, bacilli acidophili are not so universally obtainable and their culture in milk is more difficult, the intestines, not milk, being their natural habitat. For these reasons Bulgarian bacilli are more adaptable to the home fermentation of milk. To start the fermentation, a virile commercial fermented milk is employed, virility being assured by selecting a fresh product. On the first day three teaspoonfuls of the commercial fermented milk, and on the subsequent days, instead of the above, three teaspoonfuls of the preceding day's fermented milk are added to a forty-nine ounce milk mixture that has been boiled and cooled. The milk mixture thus inoculated is stirred, poured into preserve jars, sealed and stood in a temperature of 95° F. to 99° F. for twelve hours. It is then rubbed through a fine sieve into a two quart enameled pitcher, poured into preserve jars or nursing bottles, sealed and kept between two cakes of ice. Every few weeks fermentation should be started anew with a commercial Bulgarian milk to exclude any contaminating microorganisms. Milk fermented in this manner, being only moderately acid, is palatable and well tolerated.

The proper temperature for fermentation can be easily maintained in a No. 121-G New Perfection Oven, used ordinarily for baking over the flame of a gas or oil stove. This is of knock down style, hence easily dissembled and portable. To obtain sufficient room, the shelves, heat deflector and bottom are removed and discarded. Into the back part of the oven thus prepared are placed three (two pound) unopened cans of tomatoes or instead of these some other objects of like dimensions and stability. Upon these three cans are placed the two jars containing the inoculated milk and a glass tumbler holding a room thermometer. This elevates the milk and thermometer into the upper, warmer strata. Also place in the oven a lighted kerosene lamp with a flat wick, three eighths, four eighths, or five eighths of an inch wide, depending upon the room temperature. The lamp is not elevated. The oven door contains two glass panels which are easily removed by slipping them upward. By partially or completely removing one or both of these or by partially or completely opening the oven door, more or less cooler air is admitted and more or less check upon the heat obtained. By raising or lowering the flame of the lamp, more or less heat is produced. The correct height of the flame and the correct amount of cooler air to be admitted, may be quickly determined, after which a minor amount of attention is required to maintain the desired temperature.

Constipation is one of the few remaining annoyances of modern infant feeding. Its absence is essential to success. Its treatment consists, in the order of their value, of enemas of plain, warm water (being watchful of the thorough lubrication of the nozzle), liquid petrolatum, and milk of magnesia. These are harmless and may be used, one or all, in any needed amounts, indefinitely.

Calories are of little practical value in infant feeding. The energy outputs, and hence the caloric requirements, of infants vary greatly due to differences in the relative amounts of active protoplasmic tissue and fat, in the mental and muscular activities, in the areas of skin surface (radiating surface), in the clothing, and in the atmospheric conditions (9). Normal nutrition and growth are assured not by considering calories but by supplying in an assimilable form the proper amount of each class of food.

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300 Sumner Avenue.

The Artificial Feeding of Infants*

By PHILIP S. POTTER, M.D.,
Syracuse, N. Y.

Nutrition is the most important factor in pediatrics, the largest part of the immense mortality of the first year of life being traceable directly to the lack of knowledge of certain physiological laws regarding the requirements of the growing organism. The elements of food needed in infancy and childhood are the same as in adult life but the relative quantities are different from those required by the adult.

Fats are necessary to supply the animal heat, save nitrogenous waste and increase body weight. Most of the proprietary foods are low in fat and as a result we see many functional disorders commonly seen with rickets. We should bear in mind that in certain conditions the normal amount of fat is badly borne and may do positive harm, rendering it necessary to reduce the amount or replace it for a short time by carbohydrates, particularly in the following circumstances: 1, All wasting conditions depending on disorders of digestion; 2, vomiting; 3, all febrile conditions; 4, during periods of very hot weather. A failure to regard these contraindications is a constant source of trouble in practice.

Carbohydrates are the most important source of animal heat and are capable of replacing the fat waste of the body. The easy digestion of foods consisting chiefly of soluble carbohydrates, such as condensed milk and patent foods, and the rapidity with which children so fed gain in weight, lead to a great misapprehension in regard to their value as foods. The end results of such one sided feeding, if long continued, are almost invariably disastrous.

Proteins are necessary for the growth of the body cells and to replace the continuous nitrogenous waste of these cells. They should not be called upon to supply animal heat, as too strong a milk mixture will severely tax the organs of digestion and elimination. In such an event the products of decomposition may at times be toxic and cause obscure and severe clinical symptoms. On the other hand, a diet too long continued with an insufficiency of protein will cause such symptoms as anemia, cold extremities, feeble muscular power, disinclination to exertion, and various functional nervous disturbances.

Salts are necessary for cell growth and furnish the elements from which the mineral constituents of the blood and digestive fluids are formed and facilitate absorption, excretion and secretion. The most important are the phosphates of lime and magnesium. These are deficient in practically all substitutes for milk.

Water is needed for the solution of certain parts of the food, such as sugar, salts, and some of the proteins, and for the suspension of other proteins and the emulsified fat. It is also needed for the rapid elimination of the waste of the body.

During the time when the child is upon an entirely fluid diet, the addition of much water other than that supplied by the food is unnecessary, but when the number of feedings become less frequent and solid food is given in larger quantities water should be given freely between feedings at all seasons, but especially in the summer.

So much for the physiological laws which must be understood before attempting artificial feeding which is the cause of so much trouble and anxiety, and I might add that even one of large experience often finds himself baffled by the problems which individual cases present. There are infants who, owing to a feeble digestion or individual peculiarities, do not thrive even from the outset upon the usual milk modifications used intelligently.

In dealing with this problem we must remember that at the outset, when slight symptoms of intolerance to the different food elements begin to manifest themselves, we must not regard the condition lightly but must give it our close and continuous personal attention and observation. These conditions do not tend to right themselves and infants' lives are often sacrificed as a result of bad management.

Again we must not confine our whole attention to the feeding itself, but must investigate the daily routine of the infant, for this is frequently found at fault rather than the food prescribed. The food may not be prepared or given according to orders.

Environment is another factor which must be taken into consideration, especially among the well to do. The constant or frequent excitement by visitors or playing with a baby by parents and nurses may result not only in lack of sleep but in disturbances of digestion, often habitual vomiting, though the food itself is proper.

Success in treatment will depend largely upon how accurately one is able to discover the essential cause or causes of trouble and the nature of the disorder of digestion in the case under treatment. Without such knowledge all is haphazard experimentation. Drugs are of little assistance and in most cases they are better omitted altogether.

We should regard every method of modifying milk based upon adequately demonstrated facts concerning the digestion and metabolism of the infant as having its own particular value, and as being particularly fitted to meet the digestive peculiarities of individual babies. We should regard all such methods as constituting our stock of weapons which we need to combat the many difficulties springing from the peculiar chemistry of cow's milk and from the limitless variation in the baby's digestive powers and requirements. We should hail every new research and the practical application to feeding suggested by it, not as a new or better method of feeding babies, but as a new addition to our stock of weapons, a new resource, which will have its particular use in a problem, the nature of which is such that we need all the resources at present available and even more.

In feeding the normal baby the ends to be obtained are: 1, To secure a normal development of the infant that is, a progressive gain in weight; 2, to keep the infant free from all symptoms and signs of indigestion; 3, to develop the digestive powers of the infant.

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*Read before the Syracuse Academy of Medicine, October 3, 1922.

Two factors must be considered, namely: 1, chemical unsuitability which is overemphasized, and, 2, individual variations which are often neglected.

Every baby has some individual peculiarity. No method of infant feeding supersedes another method, but all have their value, especially in difficult feeding cases. To utilize all the resources of artificial feeding one must be familiar with every method of modifying cow's milk which is in good use, some of which I shall name together with their indications and contraindications.

SIMPLE DILUTIONS OF MILK AND WATER.

Advantage.—Number of different variations by the addition of milk or cream and varying amounts of milk sugar.

Disadvantage.—Makes no attempt to solve the chemical difficulties in the composition of cow's milk fat and mineral salts and in the high proportion of casein by simple dilution.

Indications.—1, Normal infants; 2, cases of fat or carbohydrate indigestion; 3, in all cases in which some special method such as whey proteid or lactic acid milk is not indicated.

COW'S MILK PLUS CEREAL DILUENTS.

Advantage.—Makes finer curds having a colloidal action and a mechanical action.

Disadvantage.—Starch is a readily fermentable carbohydrate. The minimum amount of starch for colloidal action is 0.75 per cent.

Indications.—1, Well infants after the sixth month; 2, sick infants in cases of proteid indigestion latter half of the first year; 3, undigested or green discolored movements.

Contraindications.—Not as a routine under six months.

COW'S MILK MIXTURES PLUS ALKALIES.

An alkali should be ordered with a definite purpose to produce a known result, in a quantity which best accomplishes our purpose and which is expressed in percentages of the milk and cream in the mixture. The alkalies used are lime water, sodium bicarbonate and sodium citrate. There are no indications for the use of any particular one of these alkalies. In some cases lime water works best, in other cases sodium citrate and in another sodium bicarbonate.

Uses.—1, To act on the casein curd; 2, possibly to neutralize the acid products of excessive carbohydrate fermentation in the intestine in which event twenty-five per cent. of the total mixture is used.

Indications.—1, Proteid indigestion with vomiting; 2, persistent vomiting with irritable stomach; 3, green, acid, irritating stools.

Contraindications.—None.

Peptonization.—Object is to predigest the protein overcoming casein indigestion.

Indications.—1, Persistent vomiting; 2, resistant cases when other methods have failed.

WHEY AND MILK MIXTURES.

The original idea was to obtain a closer approximation to human milk. The theoretical advantage is that we can reduce the casein in the food without reducing the total protein. It is the best method of dealing with casein intolerance.

Indications.— 1, Premature babies; 2, very young babies; 3, difficult feeding cases; 4, protein indigestion especially characterized by vomiting; 5, fat and carbohydrate intolerance.

Contraindications.—1, Acute diarrhea; 2, indigestion with green discolored movements.

VARYING CARBOHYDRATES.

These are milk sugar, malt sugar and cane sugar. The majority of the patent foods are carbohydrate foods.

Carbohydrates fulfill two distinct objects, 1, to meet caloric requirements; 2, to be in excess to afford nutriment for intestinal bacteria that is to maintain the normal bacterial flora of the intestine.

Indications.—Milk sugar: 1, In all comparative normal conditions or in conditions in which abnormal intestinal bacteria abound; 2, extra carbohydrate in normal babies; 3, comparatively slight disturbances of digestion; 4, infectious diarrheas due to abnormal intestinal fermentation with proteid decomposition with toxic symptoms; 5, symptoms due to the use of maltose in excessive quantities. Maltose: 1, Weakened digestion, atrophy and malnutrition; 2, difficult feeding cases; 3, routine treatment of chronic indigestion from fat; 4, carbohydrate indigestion from milk sugar or cane sugar.

Cane sugar: There seems to be no evident reason for using this in place of milk sugar in feeding normal infants except that it is less expensive. When babies thrive upon it they do so in spite of it, not because of it.

LACTIC ACID FERMENTATION.

This is obtained by the addition of a buttermilk culture to the milk mixture. It is better not to use fat in a ripened milk because the manipulation of the bottles causes the fat globules to rise together and makes the milk mixture indigestible.

Indications.—1, Difficulty in the digestion of the casein; 2, infectious diarrhea due to the gas bacillus; 3, acute diarrhea with toxic symptoms due to intestinal putrefaction; 4, as a feeding resource in certain difficult feeding cases, e. g., fat indigestion when the usual treatment with low fat, high proteid and maltose not successful; 5, carbohydrate indigestion; 6, green discolored movements when the usual methods of modifying cow's milk causes difficulty.

Contraindications.—1, Vomiting a prominent symptom; 2, habitual vomiting.

PRECIPITATED CASEIN (ALBUMEN MILK).

Made by taking all the casein from a pint of milk and precipitating it with rennet and suspending it in a pint of water and adding a pint of buttermilk.

Advantages.—1, Inhibits putrefactive bacteria if lactic acid is much in excess; 2, carbohydrate intolerance; 3, proteid in a finely divided form and easily attacked.

Disadvantage.—Shotgun prescription.

Indications.—Same as lactic acid fermentation.

BOILED MILK MIXTURES.

Used for possible chemical effect. It makes the casein less readily attacked by the gastric juice and prevents casein intolerance.

Indications.—1, Large casein curds in otherwise normal stools; 2, in very resistant feeding cases.

DIFFICULT FEEDING CASES.

Difficult feeding cases are generally the result of damage to the infant's nutrition by improper methods of feeding. An excess of the food itself, or an excess of one of the food elements, brings about disturbances in digestion which cause important changes in the metabolic processes of the body. From an etiological standpoint they may be grouped as follows: 1. Indigestion from an excess of food. 2. Indigestion from an excess or intolerance of fat. 3. Indigestion from an excess or intolerance of sugar. 4. Indigestion from an excess or intolerance of proteid.

EXCESS OF FOOD.

The symptoms are a loss of appetite, vomiting, colic, increase in the number of stools, failure to gain or loss in weight. The treatment consists in general in cutting down the amount of the food or weakening it. In the acute cases castor oil or milk of magnesia is given and all food stopped for twelve to twenty-four hours. When the feeding is begun the milk is at first diluted one quarter, the next day one half, then three quarters, and finally full strength. Lime water may be added to the amount of fifty per cent. of the milk and cream in the mixture. If vomiting has been pronounced skim milk is to be used in the dilutions mentioned above. In cases of diarrhea the milk is boiled. In the chronic cases the strength of the food is reduced until the baby is free from symptoms and if the gain in weight is not satisfactory the food is gradually strengthened.

EXCESS OF FAT.

The three main symptoms are vomiting, abnormal stools, and failure to gain in weight, or more often a progressive loss. The vomiting usually occurs between feedings or at the end of the feeding period. It is strongly acid and has a sour odor. Sometimes it is creamy in appearance. The stools contain many soft curds often accompanied by mucus. They may be creamy in appearance or loose, green and so strongly acid that they irritate the buttocks.

Chronic cases show large hard grey or white crumbly stools which sometimes are so dry that they roll off the diaper.

Loss of weight is marked.

In acute disturbances there is a rapid loss of weight and high fever. Rapid and deep respirations appear with stupor or restlessness and cherry red lips. This is an acidosis or what we term a "fat blow up."

Chronic disturbances manifest symptoms of rickets or those of a spasmophilic diathesis. The disturbance is so marked that we get the picture of marasmus or infantile atrophy.

In the acute cases all the fat must be taken out at once and in a few days again cautiously added checking it up by the observation of the symptoms and examination of the stools microchemically. If human milk can be obtained it should be utilized and in some instances it may even be necessary to skim it. If the case is desperate three to four ounces of a five per cent. dextrose solution is given intravenously.

In the most severe chronic cases diluted skim milk is used. In the less serious the fat must be reduced materially. In moderately severe cases it should be reduced at least to one per cent., in the mild cases two per cent. is probably sufficient.

When the stools begin to show no evidence of fat indigestion, the fat may be cautiously increased not to exceed 0.25 per cent. at a time and always controlled by a microchemical examination. Several days should intervene between changes.

The carbohydrate and proteid should be increased if possible in order to keep up the caloric value.

The sugar should not exceed seven per cent. and if there has been a previous sugar indigestion it should not exceed five or six per cent. Dextrimaltose is preferable to milk sugar because it is less fermentable and is more easily absorbed.

The proteid should be low at the start and gradually increased, stopping short of the limit of intolerance. Whey milk mixtures should not be used because of the large amount of whey salts. We might say that one could start off with a simple dilution of skim milk and water using one part of skim milk to three of water and gradually strengthen this mixture by adding an ounce of skim milk and taking out an ounce of water. Later on when fat tolerance is established whole milk and water dilutions may be used. In the mild cases half milk and half water may be used as a starting point. Enough milk sugar or dextrimaltose may be added to bring the sugar to the desired percentage.

EXCESS OF CARBOHYDRATES.

Indigestion from an excess of carbohydrates may be due to an excessive amount of either starch or sugar. The sugar at fault may be any one of the sugars—milk sugar, malt sugar, or cane sugar. The general symptoms of indigestion from this are vomiting, abnormal stools, excessive gas formation, and loss of weight. The vomiting takes place between feedings. It is watery, acid, and has the characteristic odor of lactic, acetic or butyric acids. The stools are loose or watery, green, acid and often contain more or less mucus. These acid discharges are very irritating to the buttocks, excoriation of the buttocks and genitals being one of the commonest signs of indigestion from an excess of carbohydrates. Loss of weight may be absent in the mildest of cases but is marked in the severe cases. Flatulence, colic, abdominal distention, and the passage of quantities of gas from the rectum are symptoms often seen. The extreme condition of malnutrition described as infantile atrophy may result.

The following are the main peculiarities of the symptoms caused by the various carbohydrates:

Lactose is the sugar most likely to produce acute symptoms. The stools are practically always green and very irritating. Flatulence and colic are less prominent.

Cane sugar is less likely to produce acute disturbance. Babies are likely to gain in weight on cane sugar but become pale and flabby.

Dextrimaltose preparations rarely produce acute exacerbations. The stools are often dark brown and have an acrid odor. Vomiting is apt to be more prominent and has the odor of butyric acid. Flatulence and colic are common.

Starch produces chronic symptoms only. Vomiting is rarely seen. The stools may be constipated, dry, brown and alkaline in reaction. When loose they are brown and resemble mucus. The principal symptoms are pronounced colic, flatulence and abdominal distention.

Babies fed exclusively on starchy foods may seem to thrive for a time in that they gain in weight, are of a fair color and seem lively and well. Careful examination even at this time will show, however, that there is an exaggerated tonicity of the muscles, and in a few weeks they may begin to lose in weight and color, their muscles become flabby, and gradually they take on all the characteristics of the starved atrophic infant.

The treatment is dietary from the start. The first step is to change the kind of sugar used. If milk sugar or cane sugar has been used, a dextrimaltose is substituted. If maltose is at fault the change should be made to milk sugar. If changing the kind of sugar does not relieve the symptoms, providing the sugar is not over seven per cent., then there is intolerance to sugar in general and it must be reduced to the point of relieving the symptoms. If the sugar has to be cut so low that the baby does not gain in weight, a precipitated casein or albumin milk may be used.

INDIGESTION FROM EXCESS OF PROTEIDS.

The principal effect of excessive protein in the food is confined to the gastrointestinal tract. There are vomiting, colic, abnormal stools and loss of weight. The vomiting occurs shortly after eating and usually contains large soft or very tough leathery curds. It has very little odor. The stools are increased in number, loose in consistency, brownish in color and rather sticky. They are alkaline and musty or foul. Loss of weight is comparatively slight. In the type characterized by large curds, nutrition is usually not disturbed. The treatment consists in the earlier months of infancy of using a whey milk mixture; in older children of reducing the amount of the proteid but not less than 1.5 grams to the kilo of body weight. When vomiting is the chief symptom one should try the addition of one of the alkalies to the milk modification.

In closing, let me say that just as the highest aim of medical art should be directed to the province of preventive medicine, so the highest and most practical branch of preventive medicine should consist of the study of the best means for starting young human beings in life and the objects in view should be to preserve these young infants from the perils which surround the early hours of their existence and to give them strength and vigor to resist the attacks which must inevitably be made upon their vitality.

213 WESTMINSTER AVENUE.

A Practical Consideration of the Pirquet Feeding Method*

Simplified for Children Up to One Year of Age

By HARRY APFEL, M.D.,

Brooklyn.

It will not be amiss at the start to make the statement that the method of feeding as it is being advocated by the Vienna School has never been interpreted correctly, and that is the chief reason why my first report (1) was received with a good deal of skepticism and opposition. The originator of this method, Professor Pirquet, during his recent visit to this country, was reluctant to mention it even in public, for, as he said, "I like the American doctors too much to fight with them," and so he spoke on tuberculosis instead.

My plan here is to give only a brief outline of the socalled nem system, as the Pirquet system is called, with a consideration of its practical application in office and clinic, for children up to one year of age.

A child's food requirements will be the same whether calculated in terms of nems or calories. Whereas we say a given child should get from fifty to sixty calories to the pound of body weight, we calculate the food requirements for each child by measuring the sitting height of the child regardless of its weight or age and we know exactly how much food it requires.

PRINCIPLES OF THE NEM SYSTEM.

1. Whatever food we employ, we must compare its nutritive value with that of mother's milk, the basic food. I contend that mother's milk, which answers satisfactorily to all body requirements for the growing child during its first year of existence, must consist of correct and proper food constituents, hence the term nem which is composed of the first letter of each of the three words, *Nahrung Einheit Milch* (nutrition similar to milk), or milk nutrition value (Nobel).

2. The amount of food one requires and will be able to assimilate in the course of twenty-four hours is in exact proportion to the square surface of one's intestinal tract.

3. If food in excess of this quantity is ingested it will not be absorbed, but will pass out of the intestinal canal as so much waste matter.

4. The square surface, *siqua,* of the intestinal canal can be obtained from the sitting height (*sitz höhe*) of a given patient, employing the metric system.

5. Studying the various measurements of the digestive tract as worked out by Vierordt (2), Gundobin (3) and others, Pirquet came to the conclusion that the square surface of the intestinal canal is equal to the square of the patient's sitting height. The sitting height is obtained by measuring the distance from the surface the patient sits upon to the topmost part of his skull (patient sitting undressed). In the case of an infant, it is best to lay the patient on its back, the thighs flexed with buttocks against a board, measuring from this board to the top of the patient's skull. The rule follows: sitting height square (*siqua*) is equal to the square surface of the intestinal canal.

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*Read by invitation before the twenty-third annual meeting of the Lake Keuka Medical and Surgical Association, July 6, 1922.

6. According to the Vienna school, it matters little what food elements—carbohydrates, proteid, or fats—we chose for our patient, as long as the total food contains as many nems as the number of square centimetres of the patient's sitting height, the food quantity being weighed in the metric system; one gram of mother's milk, the basic food, is equal to one nem, which is our basic measure. That the prescribed food shall contain at least ten per cent. and not more than twenty per cent. of the proteids is the only condition that the author makes.

The author goes further and says that the nem worth of every individual is not absolute but varies between a maximum and a minimum level, the latter being the quantity of food that the individual requires when he is in a state of rest, in bed and kept warm. This figure is three tenths of the sitting height square of three decinem siqua. This measure may be recommended at certain times when body exercise is very limited or when it is necessary to give the digestive tract a rest, and only for a limited time. The former is 10/10 of sitting height square or ten decinem siqua. Neither is this amount of food always employed, it is only employed in exceptional instances, and when putting on of weight is essential, for instance, in the case of a marasmic baby. There is a point between these two extremes, maximum and minimum, which the author has named the optimum scale, and which is an arbitrary point. This is from five to seven decinem siqua. This measure is the one recommended in the average case, for the reason that it includes three tenths minimum, plus one tenth for exercise, one tenth for growth and one tenth for taking on of weight, which makes a total of from five to seven decinem siqua.

The practical application of this is as follows: For instance, a baby's sitting height measures forty-five cm. The square of 45 is 2,025, in round numbers 2,000. Hence, 2,000 nems is the maximum food requirement for the twenty-four hours. Seven tenths of this sitting height square is 1,400 nems, which is the optimum food requirement usually employed. Three tenths of this sitting height square equals 600 nems, the minimum food requirement, which is rarely employed and only for short periods, this quantity not being sufficient for a growing child. It will just be sufficient for the child to exist upon.

1 gram milk=1 nem.
For maximum figure 2000 grams of milk=2000 nems.
For optimum figure 1400 grams of milk=1400 nems.
For minimum figure 600 grams of milk=600 nems.

If we wish to feed the child on, let us say, cereal, milk and sugar:

Gms.	Nems
Milk	800=800
Farina	60=300
Sugar	50=300
Total	1400
Farina	1 gm.=5 nems

It is necessary to consult the table for the nem worth of each article of food until one becomes familiar and remembers these figures by heart.

Right here is where the nem system ends. The concentrated food formulæ or whole milk and sugar formulæ which have been employed by the Vienna School are still in an experimental stage and should not be spoken of as part of the nem feeding method, although in the hands of Schick they have proved successful. Nevertheless, he himself counsels that one should not employ such mixtures indiscriminately for all children.

One of the chief objections to this method of feeding is the mathematical calculation it requires. But owing to the fact that whether we calculate in nems or calories we always think in terms of the individual case, and inasmuch as the optimum nem worth is more or less approximate, hence we cannot figure the food needed down to a fraction. We can if we choose make use of a table giving the food requirement for a given sitting height. Such a table has been compiled and adopted for use in the Pirquet outpatient clinic for the purpose of saving time.

One may still further simplify the process by consulting a table containing average sitting height for a given age. Knowing the age of a child, by consulting this table one learns at a glance the average sitting height and below it the already calculated amount of nems for the given sitting height, per one tenth of a siqua. We simply multiply the equivalent of one tenth siqua by five or seven, or as many nems as we may wish to give and we have the total number of nems required for a given child for twenty-four hours.

Feeding Scale adopted from Pirquet's Ernährungs Schule

Month	1	2	3	4	5	6	7	8	9	10	11	12
Siqua	34	35	36	37	38	39	40	41	42	43	44	45
							.1 Siqua					
Nem	100	120		140		160			180		200	
							.7 Siqua					
Nems	700	840		980			1120		1260		1400	

CONVERTING OUNCES INTO GRAMS.

Allowing that thirty grams are the equivalent of one ounce and a tablespoon being the equivalent of fifteen grams, we can easily figure out the food quantity in ounces or tablespoons and readily convert them into grams.

Example.

Milk 1 oz.=30 gms.=30 nems.
Sugar 1 tablespoon=15 gms.=90 nems.
1 gm. milk=1 nem.
1 gm. sugar=6 nems.

We all know what a responsibility everyone feels when called upon to direct a baby's feeding, especially when the baby is in its infancy, or still worse, when it happens to be a premature birth.

The doctor usually begins to calculate in terms of percentage feeding, using top milk, adding as many ingredients as would appear in a good reliable prescription twenty years ago. The more modern man will order a very much diluted milk. For example, we have been advocating to begin with one third milk to two thirds water with the result that in order that the child should get the required number of calories (nems) it must take very large quantities of the mixture.

Here is the outstanding feature of this feeding method as inaugurated by Schick, namely, to furnish the required amount of food in as concentrated a form as possible. The more obstinate your patient is to its feeding, the more concentrated should the food be made.

These investigators abroad, notably Schick (4), have shown conclusively that even the premature infant will tolerate whole milk plus seventeen per cent. of cane sugar and that there is no reason for starving a newborn infant on an infusion of cow's milk. This statement I can substantiate from personal observation with the numerous newborn infants so fed at the Schauta Clinic, Vienna, and a number of newborn infants fed on fairly concentrated milk and sugar formulæ in my office practice, as well as on my service in the Brooklyn Hebrew Maternity Hospital. At the former institution every infant is put on a whole milk and seventeen per cent. sugar formula one day after birth, and is so fed until the mother's breast can supply the required amount of nourishment for the baby.

I have found it practicable to divide my feeding children into two groups. 1. The healthy children where mother's milk is unobtainable. 2. Children suffering from some digestive disorders, such as pylorospasm, severe vomiting, and poor appetite. For the healthy baby there is no special reason for concentrating its food to any extreme, and furthermore, a little extra water will not harm. A healthy infant with a good appetite will not be satisfied with small bulk, hence, while we now give concentrated milk and water mixtures, we do not give whole milk and seventeen per cent. sugar to babies under five months except for special reasons. In the case of the sick baby we are anxious to see that it takes all the food it needs in as small a bulk as possible, hence we concentrate the food as much as possible. I can state with firm conviction that an infant will fare much better on a somewhat concentrated food than on an infusion of milk.

The question may be asked what would one consider a concentrated milk formula:

1 week to 2 months—½ milk and 2-3 tablespoons sugar to the total milk mixture.
2-3 months—¾ milk and 2-3 tablespoons sugar of the total milk mixture.
5-12 months—whole milk and 2-3 tablespoons of the total milk mixture.

For exceptional cases whole milk and sugar even at three months.

Case 1—Baby D., eleven weeks old. The child vomited after every feeding, and had five or six watery stools daily. One feeding formula which had been used was as follows: Milk, ten ounces; water, eleven ounces; dextrimaltose, two and a half tablespoons. On this formula the child lost weight steadily. It was then put on a formula consisting of skimmed milk, thirty-one ounces; water, five ounces; milk sugar, one fourth ounce, with the same result. Birth weight was seven pounds, present weight, eight pounds five ounces. Examination showed an infant undersized with a mild degree of hydrocephalus.

Treatment.—For this child's age the average sitting height:

(Si.)=36 cm.
.1 siqua=120 cm. (see scale).

This infant being much under weight we give him 8/10 siqua.
.8 siqua=960 nems required for twenty-four hours.

FORMULA PRESCRIBED.

Whole milk, 30 oz.x30 gms.=900 nems.
Barley water, 12 oz.=12 nems.
Cane sugar, ½ tblesp.=42 nems.
954 total nems for twenty-four hours.
(1 oz.=30 gms.)
(1 tblesp.=15 gms.)
(1 gm. sugar=6 nems)
Divide into twelve feedings; 3½ oz. q. 2 hrs.

Results: After two weeks, two stools a day, slept well, no vomiting, weight nine pounds three ounces (gain fourteen ounces).

RÉSUMÉ.

We are firmly convinced that the premature infant, as well as the newborn baby, will thrive much better on more concentrated milk mixtures. Vomiting is less frequent than with the more dilute milk formulæ. In cases of severe and obstinate vomiting whole milk not diluted is especially recommended owing to the fact that the quantity can be materially lessened. A rational method of calculating a patient's food requirements as well as its nutrition value. For children with poor appetite it is of great advantage, inasmuch as the quantity can be materially diminished.

TABLE OF FOODS AND THEIR NEM WORTH.

(*Figures on right hand side denote proteid content*)

Nem in 1 gram					
12	Butter	0		Beans	2
9	Nuts	1		Carrots	1
8	Salami	2	.5	Onions	1
6.5	Chocolate	0		Spinach	3
6	Sugar	0			
	Condensed milk sweetened	1		Asparagus	2
				Tomatoes	2
	Cheese	4	.2	Solot	2
	Meat, fat	2		Pickles	2
	Bologna	3			
	Shell fish	9			
5	Zweibach	1			
	Rice	1			
	Honey	0			
	Flour	1			
	Syrup	0			
	White bread	1	.1	Meat broth	3
4	Dates	.5			
	Raisins	.5			
	Sardines	5		Mother's milk	1
5	Rye bread	1		Cow's milk	2
				Green peas	2
			1	Grapes	5
				Bananas	5
				Figs	5
	Cream	1		Liver	5
	Herring	5	2	Kidney	5
3.3	Mushrooms	3		Lean meat	6
	Jam	0			
	Puddings	1			
	Egg	3	1.5	Brains	3
2.5	Chestnuts	1	1.25	Potatoes	.5
	Fresh fruit	4		Fresh fruit	5
2.5	Smoked fish	3	.6	Fruit juices	0

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182 NEW YORK AVENUE.

Febrile Conditions in Children*

By HYMAN GOLDSTEIN, M.D.,
New York,
Visiting Pediatrist, Day Nursery Daughters of Israel; Assistant Physician, Children's Clinic, Lenox Hill Hosp. O. P. D.; Chief Visiting Physician, Home of the Sons and Daughters of Israel.

The problems involved in febrile conditions of children are many. Hyperthermia and its results are more or less dependent upon the individual peculiarities of the one affected, of the cellular metabolism and the excitability of his nervous system. This explains the ease with which temperature fluctuates in children from the slightest cause.

In all cases of fever we get certain secretory, circulatory and nervous disturbances since body temperature represents naturally the balance between heat production and heat loss. The production of temperature is affected mainly in the muscles by the oxidative processes which are constantly ensuing there. Fever may be caused by infectious processes; parenteral injection of foreign protein; excessive destruction of protein substances in the body itself; action of certain drugs and injury to the base of the brain or lesions of the upper levels of the spinal cord.

There is a specific destruction of protein going on in the body during fever, evidenced by excessive amount of creatinine, of purin bases, and incomplete hydrolyzed proteins or proteoses in the urine. This causes a considerable loss of nitrogen and hence disturbs the nitrogenous equilibrium. Therefore in fever patients our object should be to maintain nitrogenous equilibrium by feeling large amounts of carbohydrates. The increased combustion processes occurring in the tissues are responsible also for the increased excretion of uric acid. Hypoxanthin and its precursor inosonic acid in large amount in the muscular extract is an important source of endogenous uric acid. Lithia salts and also bicarbonate of soda should be administered in febrile conditions, the former to prevent uric acid concretions from forming and the latter to protect against possible acidosis. Another interesting metabolic change in fever and also from a prognostic viewpoint is the salt balance. This is studied by observing the amount of sodium chloride excreted by the urine. If it is much diminished it may be a danger signal. Salt retention is more marked in certain fevers than in others, and essentially different than the salt retention in nephritis. In the latter the concentration of chlorides in the blood is considerably increased, whereas in fever it is markedly diminished. Increased retention of creatinine in the blood in nephritis is a danger signal. Fever is but a symptom of an abnormal condition in the individual, the root of trouble which must be found. It is not so often easy to get at the source, as I will show in the following cases:

REPORT OF CASES.

CASE I.—S. M., five years of age, was referred to me during March, 1920. She had a slight follicular tonsillitis involving the right tonsil; tem. 103° F. Chest, ears, eyes, skin and glands negative; abdomen revealed rigidity of the right rectus muscle, marked tenderness at McBurney's point and a definite round, painful mass in the same region. Her chief complaints were fever, abdominal pain and nausea. Rectal examination showed also tenderness at the right side. Blood examination showed 21,000 leucocytes, ninety-two per cent. poly., and eight per cent. lymph. This picture was tentatively one of acute appendicitis with abscess. The latter diagnosis was confirmed by the consulting surgeon. Because of the happy or cheerful expression of the little patient and the sthenic pulse I looked for another interpretation of the symptoms and ordered another specimen of the blood and a catheterized specimen of the urine to another laboratory. In the meantime an enema was given with an excellent result. The author called the surgeon's attention to this, who remarked that the abscess must have opened up into the cecum and that this was an admixture of pus and feces. I could not agree with this explanation, for two reasons, first, that the child appeared too well generally to account for a ruptured abscess in the gut and, secondly, that with the result from the enema the abdominal mass disappeared. The fever still continued. The second laboratory report showed 7200 white blood cells, sixty-eight per cent. polymorph. and thirty-two per cent. lymphocytes. The urine was loaded with leucocytes and clumping, little albumin, acid, no casts but many colon bacilli. The diagnosis of pyelitis was then evident. Long continued treatment with urotropin in acid media alternating with the alkaline treatment from time to time, modified lactovegetable diet and bacilli acidoph. tablets cleared up the condition. She is quite a healthy youngster now.

CASE II.—A. J., two years of age, seen in consultation February, 1921. He was dressed and playing in the room. His face was flushed and temperature 104° F. He was in fever from time to time for several weeks and his case diagnosed by many to be teething, indigestion, influenza and finally brain fever. The latter alarmed the mother and the author was consulted. Outside of being a little tired, he complained of nothing and physically he was normal except for the temperature. I had him urinate and boiled a specimen which showed a marked amount of albumin. He was placed on acid urotropin treatment. In the meantime a more thorough laboratory examination of the urine was made. The findings confirmed the diagnosis of pyelitis. He responded well to treatment. Occasionally during the following six weeks for a day or two he would have a subnormal temperature in the morning and a high temperature towards evening. The pus in the urine cleared up. Three months later the writer was called in again and found the patient's head bandaged and got the following history. The family physician recommended an ear specialist who pierced both drums with no result. A week later the right mastoid was operated upon and much pus came through, and the wound took a few weeks to heal up. The fever still continued in remissions. The adenoids and tonsils were removed but the temperature still remained up. The child began suffering from asthma now. Removal of the mattress, pillows and blankets did no good and also all protein sensitization tests were negative. The child was also frequently subject previously to attacks of bronchitis. The urine was again loaded with pus. He was placed again on acid urotropin treatment. Thyroid and pituitary extracts in small doses relieved his asthmatic attacks. His urine became clearer. I observed that the walls of the rooms were dripping and that there was a very damp, foul odor. I ordered him to be removed to dry living rooms and he was transferred to his aunt's home where he had no attacks of the asthma or fever. When at home it returned. Change of address to a steam heated apartment relieved him. Since then he does not suffer. Aided by the other treatment the kidneys cleared up.

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*Read before the Yorkville Medical Society, December 20, 1922.

Case III.—J. K., three years of age, was referred to me by Dr. Schutz. Upon examination I found the patient playful, face flushed, slightly nauseated, temp. 103° F., physically negative except for tenderness at McBurney's point and slight rigidity. Rectal examination revealed nothing for the child resisted too much. From the general aspect of the case I diagnosed it as one of a general intoxication, the source of which should be sought. The urine showed many leucocytes and clumping with acid reaction while the blood count and differential were negative. Hence pyelitis was the source of trouble and proper treatment cleared up the condition.

Case IV.—Dr. C. N. Gelber consulted me in reference to Dr. M.'s baby, whose ear drums he had lanced. They had drained well but, in spite of this, the child was running a temperature. Upon physical examination I discerned a definite pneumonic lesion, although small at the left base, peripheral in type. Not until the third day thereafter did the lesion become more distinct, meaning that the complete area to the bronchus had consolidated causing the physical signs to show up clearly. The child made an excellent recovery.

Case V.—An infant eight months old was brought into my clinic at the Lenox Hill Hospital with a history of falling upon a nail that stuck in the skin behind the right ear and which was removed. The following day the temperature was 103° F. and the baby had a slight diarrhea with slimy green stool which in spite of this was diagnosed as teething. Physically the head, special organs, reflexes, skin, glands, chest and abdomen, except for a little rigidity, were negative. The pharynx was congested and tonsils submerged with exudate oozing from its crypts. There seemed to be an acute tonsillitis and gastroenteritis. For further study the author referred the child to the hospital division. When admitted the next morning the child was normal except for a slight congestion of the pharynx and cryptic exudate but normal temperature. In fact, the admitting physician was reluctant to admit the child. The same evening the temperature rose to 104° F. On the third day the lower and upper extremities developed a flaccid paralysis and the child was in a semicomatose condition. During the next two days the temperature was subnormal in the morning and high in the evening. The spinal fluid was blood stained and other laboratory examinations revealed little. That evening the temperature rose to 106° F., the child's heart collapsed, but with urgent emergency stimulation began beating feebly and soon after the infant died. An autopsy showed a cyst of the lateral ventricle on the right side with compression and edema of the cerebral convolutions, and a little fluid in the pericardium and pleura. The collapse was undoubtedly due to the sudden filling up of the cyst in the lateral ventricle and the pyrexia because the lesion approximated the region of the heat center in the brain.

In Cases I and III it will be noticed that the symptoms were panoramic and not pathognomonic in their arrangement. In appendicitis we usually discern first diffuse abdominal or umbilical pain, vomiting, fever, then localized pain in the right iliac or McBurney's region with zone tenderness and often retained enema, the latter as a result of the peritoneal irritation splinting the intestine. This order of symptoms did not occur in these cases. Secondly, the facies and pulses were not suggestive, and thirdly, do not place too much reliance upon the laboratory findings alone which at times is very inaccurate and misleading, as is well shown in the first case. Case II was undoubtedly one of low resistance with malnutrition predisposing this child to infection due to the effects of the high humidity or dampness in the living rooms with resultant systemic infection most likely of the influenza type thus affecting this human barometer. Case IV points out to us the necessity of careful physical examination of the chest. Unexplainable fever, rapid respirations with dilating nostrils when breathing should put one on guard as to the possibility of peripheral pneumonia formerly known as central pneumonia, being present, even if early signs cannot be detected. Case V is very interesting both for the general practitioner and the consultant. Don't be overanxious to lessen the load by telling the mother "your child is teething or nothing is the matter with your child—it is just a little of this or that, etc., or to criticize the other physician before you, who, perhaps upon calling, found the child perfectly normal, although a dangerous condition was brewing within, as in this case when the child was first admitted in the hospital. A good reputation may be undone over night or cause one to become involved in a complicated law suit.

You will notice that I have purposely left out a description of other known febrile conditions, i. e., typhoid fever, malaria, meningitis, tuberculous conditions, rheumatism, dysentery and the contagious diseases most are familiar with. However, it will not be amiss here to caution against mistaking rubella, anaphylactic serum and food protein rashes for scarlet fever. In scarlet fever, aside from the characteristic faucial angina and tongue you will notice an almost chocolate brown line at the elbow, pit of the axilla, wrist and groin at the flexor surfaces because the rash has a tendency to become more confluent and thick near the folds of the skin. In rubella or German measles, besides the mildness of the rash and other symptoms, the posterior cervical glands are enlarged.

When children complain of growing pains, asthenia, weakened cardiac impulse and palpitation, frequent sore throat, choreic movements and nervous irritability, think of rheumatism. Tuberculous bronchial glands will often explain many conditions that are frequently overlooked. Typhoid fever, malaria, cerebrospinal meningitis and general tuberculosis run an atypical course in children. The careful physical examination, careful history and course of the disease will help considerably to diagnose the case. Tuberculous meningitis must be thought of particularly in young infants and often is of the bovine type. Examination of the ventricular fluid may help where the spinal fluid is hard to obtain. This may also be adopted as the route for therapy.

PULMONARY CONDITIONS IN CHILDREN.

Of pulmonary conditions in children bronchopneumonia is prevalent before the fourth year because of the greater number of cases of diphtheria, pertussis and exanthemata at this age after which year lobar pneumonia becomes the predominating type. In most instances the consolidation is small and involves but a very little area of lung tissue at the periphery not reaching any part of the bronchial tree and rarely giving any physical signs, except the positive subjective symptoms. This condition is known as peripheral pneumonia formerly regarded as central pneumonia which is really a misnomer. The objective findings here may be just a little distant bronchial breathing or increased fremitus; a little rough breathing or, few râles heard either in the small of the back between the wings of the scapula, pit of the axilla or sixth interspace postmammary line, as compared with the healthy side. Early stimulation in pneumonia of children is essential. Dr. A. L. Goodman and Dr. J. S. Leopold are getting excellent results and a surprisingly low mortality rate in their cases at the Lenox Hill Hospital and the author finds it so in his cases from such treatment. I would strongly caution against the injudicious use of digitalis in pneumonia. When indicated give a big dose and don't depend upon it as the only stimulant. While digitalis energizes the systole it prolongs the diastole of the heart, and, its accumulated action may cause heart block, in which condition the tired cardiac muscle cannot get back to systole and hence a patient getting along well may suddenly collapse because of this. Other stimulants should be used singularly or combined, such as caffeine sodium benzoate, strophanthus, strychnine, convalleria, camphorated oil, sparteine along with ammonia salts, guaiacol carbonate, etc.

The individual characteristics must be considered in each case, the symptoms as they appear in their chronological order has significance and must be analyzed as such, as well as interpreted *per se*. Therefore an accurate history in every case is essential. The textbook is a guide, but not a book of labels from which one can take a label and paste it onto the patient giving him this or that disease. In other words generalize the disease (that is what the textbook is for) but individualize each case.

182 LEXINGTON AVENUE.

A Comparative Chemical and Clinical Study of Boiled Butter and Cream in Infant Feeding

By HARRY LOWENBURG, A.M., M.D.,
Philadelphia,
Pediatrist, Mt. Sinai Hospital, Jewish Hospital, Etc.

The need of the growing organism for fat is no longer a matter for discussion. The etiological influence of bovine butter fat in many cases of acute alimentary disturbance occurring in the artificially fed suckling also appears to be well established. Between these two antithetical activities, the one constructive, the other destructive, the pediatrist and the dietitian have labored to find a happy solution to the problem of how best to supply this much needed ailment so that it will be digested and assimilated without producing irritation with resulting loss of weight, which is usually the condition for which it was originally added to the food ration. All sorts of means have been devised to change physically or chemically the character of butter fat as it is found in cow's milk or to determine upon a suitable substitute for it. Pancreatization, the complete or partial elimination of fat by the use of skim or partially skimmed milk and the substitution for the aliment thus lost of extra carbohydrate, have been the means most frequently proposed and are often, within certain limits, productive of splendid results, providing other measures are at the same time employed to provide antirachitic factors. I have fed hundreds of infants upon diluted skim milk mixtures and am therefore convinced from this experience that it can be done successfully using surprisingly weak dilutions. However, it may be readily admitted that the method is a questionable means toward a good end and leaves much to be desired in order to combat certain biochemical deficiencies which occur in spite of the progressive gain in weight, as for instance rickets, as just stated.

The experience and opinions of a host of technical observers prove that fat is essential to the growing child. Nevertheless, having knowledge of its power for harm, many have underfed with this substance. Others, unmindful or uninformed of its possible baneful influence, continuously overfeed with it. This in its last analysis amounts to the same as underfeeding, for the resulting acute alimentary disturbance, as manifested by vomiting and diarrhea, causes the imbibed fat to be lost per primam viam and the organism assimilates none or little of it. It becomes plain, therefore, why many infants who are losing weight on high fat mixtures will start to gain when fed low fat, as represented by skim milk dilutions, because they absorb and assimilate that which they imbibe. However, when it becomes necessary to increase the fat, it cannot always be accomplished by the addition of cream, without producing an acute upset. The problem has been, therefore, to find a way of supplying this needed fat in sufficient amount and in a form acceptable to the digestive apparatus. This seems to have been solved by the butter-flour mixture of Czerny and Kleinschmidt. This consists in adding, according to the weight of the infant, one third or two fifths of boiled cooled milk to a stock solution which must contain equal parts (twenty grams each) of boiled butter and flour, fifteen grams of cane sugar and three hundred c. c. of water. I have employed the butter-flour mixture in what appeared to be suitable cases and largely with good results.

The difficulties encountered it is not necessary to discuss here, as the purpose of this communication is simply to detail my experience with the simple addition of boiled butter, instead of cream, to ordinary skim milk dilutions containing nothing more than skim milk, water, sugar and salt, with or without the addition of starch in the form of a cereal decoction or of a previously indeterminate amount of boiled and baked brown pulverized flour ball containing or not a small amount of extract of pancreatin and bicarbonate of soda. The addition of flour ball is mentioned to call attention to the fact that it is an age old remedy of extreme usefulness and corresponds in a sense to the browned flour used in the butter-flour mixture of Czerny and Kleinschmidt and antedates this procedure by probably a century or more. The reason why it is possible to feed the large amount of fat as represented in the butter-flour mixture and not feed the same amount as represented by cream or top milk added to a formula which also contained starch, has not been stated definitely by the large number of clinicians who report their experiences with this method. Some have conjectured that it is due to the driving off of the volatile fatty acids and others that it depends upon the browning of the flour in the process of baking. The latter seems untenable as browned flour as represented by the prepared flour ball has been often employed in mixtures wherein the fat was represented by top milk or cream and the tolerance of the infantile digestive apparatus for the extra fat was not improved.

The matter appeared to be of sufficient importance as to merit investigation and the problem was first attacked clinically and later confirmed by chemical study. The theory that the tolerance for bovine butter fat, as found in the butter-flour mixture, depended upon the equality of proportion between the amount of flour and that of butter being maintained, did not work out clinically for I have often found it necessary and helpful to reduce the quantity of flour on account of extreme constipation and gaseous distention. After all, while the infantile digestive apparatus is the last arbiter as to the digestibility and assimilability of any formula it seems a bit too much to credit these organs with brains and temperament that would cause them to reject food simply because it did not correspond to a man made rule that such and such ingredients must exist in equal proportion.

At first butter boiled slowly for five minutes as directed by Czerny and Kleinschmidt, in measured quantities instead of cream, was simply added to skim milk dilutions without reference to whether they contained flour or starch in any form. In the beginning small amounts were added, such as a quarter of an ounce to a thirty or forty ounce mixture. Gradually these quantities were increased until one and a half to two ounces were added to a thirty or forty ounce skim milk formula. It was found to agree surprisingly well, as indicated by the protocols of the thirty-eight cases occurring in private practice and herewith submitted.[1]

The number of cases studied it is true is small, but it is thought that they constitute a sufficient nucleus to warrant further investigation and to indicate with a certain degree of probability that the success lay in the boiling of the butter.

Gain in weight was maintained in nearly all cases, in one in spite of a severe eczema; in one case a gain of sixteen ounces was recorded in four days. One infant gained slowly and had several periods of stationary weight because of an unexplainable yet persistent anorexia which seemed to date from birth, and was the cause of removing the baby from the breast. In three or four cases fever developed, due to otitis media or grippe, and in one case to pink eye. All these infants suffered a temporary loss of weight or remained stationary. Gain, however, was inaugurated as soon as the parenteral infection subsided. Three babies also showed slight dyspeptic symptoms which subsided when they recovered from the infection. One, running a temperature as high as 105° or less for two or three weeks, due to pyelitis, ceased to gain and had some temporary digestive disturbance. Its bowels, however, speedily became normal before recovery simply by reducing the entire strength of the food one half without removing the butter. After complete recovery this infant gained eight and a half ounces in three days. In another instance failure to gain was thought to be due to extreme poverty and ignorance as to the general care of the infant. Abnormal digestive phenomena were absent, and in many instances vomiting ceased.

In two cases of partial pyloric obstruction, in which the infants were doing well on thick farina the boiled butter was added to the cereal without a renewal of the vomiting. In two instances, diarrhea with temporary loss of weight, was recorded. Both these babies suffered a change in milk by reason of removing from the city to the country. The stools in the remainder were normal and even in some cases constipated. The reaction was invariably feebly or markedly alkaline. In two other cases with diarrhea and in which the usual treatment had been given consisting of a hunger period of saccharated tea for twenty-four hours followed by a protein milk, after constipation had occurred, the boiled butter was gradually added to the protein milk mixture without causing a renewal of the trouble. It was thus clinically determined that this substance was tolerated in a variety of conditions where from previous experience it was felt that the addition of cream would have been a hazardous undertaking. The tolerance for boiled butter with or without the addition of starch having thus been determined clinically it was decided to ascertain why boiled butter possessed this advantage over raw butter and cream.

Before proceeding further it is necessary to emphasize two phases of this subject which in no way invalidate the statement that the infantile digestive apparatus can digest and assimilate pure unaltered boiled butter. First, the method of preparation as described by Czerny and Kleinschmidt is unnecessary according to the results obtained in the cases which provide the basis of this study, as in no instance was this method followed. Second, while admirable results were obtained by the simple addition of boiled butter to a suitable dilution of skim milk there is an important practical objection to its use in this manner by reason of the fact that boiled butter will not readily emulsify in such a mixture and rises to the surface. Thus, if the infant should happen not to finish its bottle this portion of the ration will be lost. While this difficulty may be partially overcome by thoroughly whipping the mixture with an egg beater and by frequent agitation of the bottle during the act of feeding, nevertheless the addition of starch in some form, either as a cereal decoction or as the pulverized flour ball, will insure a more thorough distribution of the butter throughout the mixture. For practical purposes one half to one ounce by measure of the flour ball will be sufficient for a twenty ounce mixture. It cannot be too strongly emphasized, however, that experience seems to prove that there is no need for the starch addition to insure the digestion of the butter. A paste is made of the flour ball and two or three ounces of the skim milk mixture. The remaining portion of the mixture is made hot in a double boiler and then thoroughly mixed with the paste and the whole boiled two minutes, whipped till cool, and then bottled. The fat will rise to the top of each bottle but when the latter is warmed and shaken preparatory to feeding the fat is found to be well distributed throughout the mixture.

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[1] Since writing this article my experience now includes some one hundred and ten cases and there seems to be no good reason to depart from the conclusions enumerated.

The preparation of the butter itself is not difficult. It need not be freshly prepared each day. One quarter of a pound or more of sweet butter is melted in a deep agate cup. It is then slowly boiled over a low flame from three to five minutes. The time is not counted until the butter actually boils. It is then kept in agate or china on ice. The finished product neither tastes nor smells like butter. As stated the presence of small carbon particles may be disregarded.

The fatty acids contained in bovine butter fat have long been recognized to exist in a much less stable combination than those found in human milk, and in order to determine whether the tolerability for boiled butter depended upon the complete or partial dissipation of these acids by reason of the high degree of temperature to which they were subjected, the following experiment was undertaken, at my suggestion, by Dr. A. I. Rubenstone, of the Mt. Sinai Hospital.

1. a. One hundred c. c. of melted sweet butter, unboiled, bought in the open market, were tested for total acidity in terms of decinormal sodium hydroxide and it was found that twenty-seven c. c. of this solution were necessary to accomplish neutralization. b. After boiling one hundred c. c. of sweet butter slowly for five minutes it was found that eleven c. c. of the decinormal sodium hydroxide solution were necessary to accomplish neutralization.

2. a. One hundred c. c. of melted salted butter, unboiled, bought in the open market, were tested for total acidity in terms of decinormal sodium hydroxide solution and it was found that twenty-nine c. c. of this solution were necessary to accomplish neutralization. b. After boiling one hundred c. c. of salted butter slowly for five minutes it was found that fourteen c. c. of the decinormal sodium hydroxide solution were necessary to accomplish neutralization.

3. a. One hundred c. c. of cream, unboiled, bought in the open market, were tested for total acidity in terms of decinormal sodium hydroxide solution and it was found in twenty-eight c. c. of this solution were necessary to accomplish neutralization. b. After boiling one hundred c. c. of cream slowly for five minutes it was found that twenty-two c. c. of the decinormal sodium hydroxide solution were necessary to accomplish neutralization. These experiments may be briefly expressed as follows:

A. 1. 100 c. c. raw melted sweet butter plus 27 c. c. N/10 Na OH solution=neutrality.
2. 100 c. c. sweet butter boiled five minutes plus 11 c. c. N/10 Na OH solution=neutrality.
B. 1. 100 c. c. raw salted butter plus 29 c. c. N/10 Na OH solution=neutrality.
2. 100 c. c. salted butter boiled five minutes plus 14 c. c. N/10 Na OH solution=neutrality.
C. 1. 100 c. c. raw cream plus 28 c. c. N/10 Na OH solution=neutrality.
2. 100 c. c. cream boiled five minutes plus 22 c. c. N/10 Na OH solution=neutrality.

It appears that the total acidity of salt butter is slightly in excess of that of sweet butter and that of cream corresponds about to that of salted butter. Further, it is noted that boiling reduces the total acidity of both sweet and salted butter by a little more than half and that this is most pronounced in the case of sweet butter. The most striking feature, however, of this experiment is that comparing the effect of boiling upon both sweet and salted butter with that upon cream it is noted that there is comparatively little effect from boiling upon the latter. By this simple investigation it appears, therefore, that an explanation is available as to why cream, when added boiled or unboiled to milk formulas, frequently causes acute alimentary disturbance as manifested by vomiting, diarrhea and loss of weight. On the other hand, it appears patent as to why the addition of either boiled sweet or salted butter is without this effect and the preference seems to point toward sweet butter although clinically no difference in effect has been experienced. Mere boiling of milk and cream mixtures does not assist in the digestion of fat, although it does improve the digestibility of the curd.

It was noted while boiling butter that, without decreasing the degree of heat which is necessary originally to cause boiling, ebullition would cease and from thence onward charring or carbonization occurred, the effect of which was to cause the formation of a brownish or black sediment. It was therefore determined to ascertain what relationship existed between the duration of the boiling and the reduction of the acidity. With this in view Dr. A. I. Rubenstone, at my suggestion, kindly carried out the following experiment, the numerals expressing the number of cubic centimetres of decinormal sodium hydroxide solution necessary to bring about neutrality.

Sweet butter: Before boiling, 26.4 c. c.; boiled one minute, 17.2 c. c.; boiled two minutes, 14 c. c.; boiled three to four minutes, 13.8 c. c.; boiled five minutes, 13.5 c. c. These figures are averages obtained from repeating the operation four times.

It will be noted that practically the same degree of reduction is obtained from boiling the butter two minutes as from the longer periods. Clinically, however, it has been determined that better results are obtained when the boiling is prolonged a little longer —preferably to four minutes—and a slight degree of carbonization appears to be advantageous. It is extremely important that the directions as to boiling be explicitly given and carefully carried out, stress being placed upon the fact that four minutes means actual boiling. It is also essential to impress upon the mother that the milk employed in the mixture must be thoroughly and carefully skimmed else the purpose for which the boiled butter is substituted for the cream will be defeated and the results will not be so good.

The well known growth producing qualities of the fat soluble A vitamine and its presence in butter fat suggested the thought that it may, in raw butter and in cream, be inhibited in its functional activity by reason of the close proximity of an excess of volatile fatty acids and that by reason of their destruction or diminution in boiled butter this activity may be released to functionate to its fullest extent. There is as yet no scientific proof of this, inasmuch as the heat necessary to boil the butter may at the same time inactivate the fat soluble A vitamine. However, the gain in weight in many instances was so great and so instantaneous and entirely out of proportion to the amount of nourishment given that it appeared that nothing short of a tremendous impetus to growth had been provided by an unrecognized factor. At the present time I am conducting animal experiments in this connection and hope to report my results at a later date.

CONCLUSIONS.

1. Volatile fatty acids exist in butter in even less stable combination than they do in cream.
2. Boiling butter five minutes slowly will drive off over fifty per cent. of these acids.
3. Boiling butter two minutes is sufficient for clinical purposes; however, from three to four minutes would probably be a safer average.
4. Sweet butter contains less volatile fatty acids than does salted butter.
5. Boiling cream does not materially change its acid content.
6. Boiled butter may be added advantageously, in varying and gradually increasing quantities, to skim milk formulas or other food combinations.
7. Boiled butter appears to be a more acceptable addition to milk formulas than does cream.
8. The presence of flour or other forms of starch, though acceptable, to ensure an even distribution of the fat, are not necessary essentials to the digestibility of boiled butter; especially they do not have to be present in equal amounts.
9. Vomiting and diarrhea are neither inaugurated nor made worse by the addition of boiled butter; on the contrary, they often cease after the addition of this substance.
10. Constipation has been the rule and the reaction of the stool has been found to be feebly or markedly alkaline.
11. All cases, free of parenteral disturbances, to which this substance has been fed, have experienced a uniform gain in weight, averaging on ounce to nearly two ounces per diem.

2011 Chestnut Street.

Blood Transfusion in Malnutrition and Infantile Atrophy*

By J. D. LEEBRON, M.D.,
Philadelphia,

Instructor in Pediatrics, Graduate School of Medicine, University of Pennsylvania, Chief of the Pediatric Clinic and Visiting Physician to the Children's Ward of the Polyclinic Hospital.

In presenting this report it is not my intention to affirm that transfusion is a definite therapeutic agent or a cureall in such cases. In all cases of malnutrition and infantile atrophy that either do not respond to tried measures or fail to make any progress, transfusion, if properly carried out, is practically devoid of danger and is the means of bringing an early favorable outcome. In this series of cases in which we have used transfusions and in such athreptic cases where we intend to use it in the future, all conservative pediatric measures have been and will be carried out before transfusion is considered.

INDICATIONS.

The indications for transfusion in malnutrition and infantile atrophy, as we consider them, are: 1, improper assimilation of food resulting in atrophy and progressive loss of weight; 2, secondary anemias from any cause resulting in malnutrition; 3, circulatory depletion from such conditions as acute gastrointestinal disturbances with the associated signs of collapse; 4, those cases of apparent exhaustion in which we find cold extremities, a semicyanosis of the skin, very feeble heart sounds and a thready pulse, and where a definite diagnosis cannot be established.

AMOUNT OF BLOOD.

This is one of the most important factors for success in the transfusion of infants. Many failures and deaths are no doubt due to hypertransfusion. It is better to give small amounts, repeated in ten days or two weeks, than to give a large amount at the first operation. Lucas and Dearing (1) have pointed out the variability of blood volume in infants. They report the average blood volume as 147 c. c. to the kilogram of body weight (4.7 per cent.). We have felt that we were within the limits of safety by transfusing 10 c. c. to the pound of body weight. With this rule as our criterion we have never had any of our patients exhibit symptoms of an overdose which are those of over distention of the right ventricle.

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DONORS.

In choosing donors for transfusion of infants three things are necessary; first, a negative Wassermann reaction; second, a blood count, and third, a careful estimate of the compatibility of the donor's and recipient's blood. In an emergency the first two may be omitted but under no circumstances the last. Although Kimpton states that children under two years of age probably belong to no group, Pemberton, from the Mayo clinic, states that infants develop their own group after the first two weeks. Cherry and Langrock (2), in a series of thirty-four cases, used the mothers as the donors for transfusion in newly born infants with no untoward results. In those cases in which the patient is extremely ill, or in which the type reading is at all doubtful, a crossed hemolysis test should be made.

METHOD.

There is a great difference of opinion as to which method should be used for transfusion. Three of the children in our series were transfused by the citrate method and two by the socalled direct method, the syringe cannula being used. It is unnecessary in this paper to discuss the collection of the blood from the donor. The infant is wrapped in a sheet, with the head exposed and placed flat on its back. It is of the utmost importance to have an assistant who understands what you are attempting to do, as this results in cooperation avoiding friction and loss of time. If the anterior fontanelle is still open, the superior longitudinal sinus route is employed. The hair is shaved from the anterior fontanelle and a five per cent. solution of picric acid in alcohol is applied for skin sterilization. The fontanelle is then divided into four equal parts, and a needle of fairly large caliber, about an eighteen gauge, is inserted at the anterior internal angle of the right posterior quadrant. As soon as the blood begins to flow from the needle, the syringe or the adapter from the citrate cannula is attached and the flow established. After the administration of the first five or ten c. c. we wait a few minutes to see if there has been any slip in our typing technic. If no reaction is visible, the transfusion is continued.

It is important to administer the blood very slowly. We allow forty to sixty seconds for each c. c. of blood to enter. There is no doubt in our minds that in some of the cases of reported fatalities the cause of death has been a too rapid introduction of the transfused blood. In cases where it is impossible to use the superior longitudinal sinus the median bacilic or cephalic vein may be used, and if these are too small, an attempt can be made to utilize the internal saphenous vein at the knee.

In our series of cases we had one severe reaction which lasted twenty-four hours. This followed a second transfusion. The child had been removed to another hospital for the operation, and it is possible that the moving of the very sick infant backward and forward may have played some part. However, the child afterwards improved and made a very excellent recovery. Meleny has shown (3) the more transfusions a patient is given the more likely he is to have a reaction.

The transfusion of dehydrated cases seems to replenish the depleted circulation in a more stable manner than the intraperitoneal saline injections. This may be due to the fact that saline infusion does not maintain the blood volume as long as does blood. The blood probably helps in two ways. Ashby (4) of the Mayo clinic has shown that the red blood corpuscles remain as functionating cells in the circulation for about thirty days. In summing up her article she says: "The beneficial results of transfusion are without doubt not due primarily to a stimulating effect on the bone marrow, but, it is reasonable to assume, to the functioning of the transfused corpuscles." This is not agreed to by all observers and we agree with Stengel that in the anemias hematopoietic function is stimulated by the transfusion. In all our cases the patients showed a general improvement in health with a disappearance of the restlessness and anuria and an improvement in the general nutrition. The hemoglobin increased from ten per cent. to twenty per cent. with each transfusion, and the red blood cells increased as high as two million.

Robertson, Brown and Simpson (5) have shown that in eighty-seven cases of marasmus, in which transfusion was done, the mortality was forty-five per cent., while in another series of cases, which was managed with and without transfusions, the mortality was fifty-seven per cent. In the first series twenty-one per cent. of the patients were in a state of collapse at the time of transfusion. Their average weight at five months was seven pounds. Of the collapsed patients forty-three per cent. made a complete recovery. In the second series eighty-two per cent. of the moribund patients died. The average red count before transfusion was a million and a half red blood cells, sixty per cent. hemoglobin. This was raised to an average of five million reds and eighty per cent. hemoglobin. It will thus be seen that in most of the cases there was a moderate degree of secondary anemia. The patients having no anemia benefited little from the transfusion. In the majority of cases there was no immediate change in the weight, but there was a definite improvement, as was manifested by tolerance to food, and a lessened tendency to a subnormal temperature. In some cases there was an immediate gain in weight, and the injection of blood was a big factor in life saving. We agree with the authors that any remedy that reduces a mortality from fifty-seven per cent. to forty-five per cent. and in the moribund cases from eighty-two per cent. to forty-three per cent. is worthy of serious consideration.

CONCLUSION.

1. The transfusion of blood by any method is a simple and often a life saving procedure.
2. We have found it of distinct value in the treatment of cases of malnutrition and infantile atrophy.
3. It is of the utmost importance to be careful in the amount of blood transfused and in the rapidity of its introduction.
4. The route for introduction in infants seems to be simplest if the superior longitudinal sinus is used.

I am indebted to Dr. Ravdin for his valuable assistance and cooperation in this preliminary report. I feel certain that the success in this short series of cases was entirely due to his fine technic and the careful manner in which he performed transfusion.

1425 Spruce Street.

References will appear in author's reprints.

Editorial Articles

THE DISCOVERY OF VACCINATION

Edward Jenner, the discoverer of vaccination, died in the same village in which he was born, Berkeley, Gloucestershire, England, on January 26, 1823. The principle of immunization against smallpox had been known for a considerable time and was introduced into England by the celebrated, in some ways notorious, Lady Mary Montague, who had observed in Constantinople that by its employment a certain amount of protection was afforded against smallpox. Somewhat later, inoculation against variola was introduced into New England. As a matter of fact Jenner then applied in his own practice a variation of a method which had been proved of value in modifying the severity of an attack of smallpox. At the same time he was truly the discoverer of scientific vaccination and thereby one of the greatest benefactors to the human race who ever lived.

There is no need to go over the history of Jenner's discovery. It is enough to say that living in a part of the country in which dairy farming was largely carried on, he was aware of the popular belief that cowpox, when introduced in the human system, prevented smallpox or greatly modified the acuteness of an attack.

In 1796, twenty-one years after he had begun to make experiments and to investigate the matter, he performed his first public vaccination, having previously inoculated his own son, aged one and a half years, with cowpox. The lymph for the vaccination came from the hand of a dairy maid infected in the course of her work. The vaccination was successful and from that time on Jenner practised regularly his new method. In 1798 he published his famous *Inquiry Into the Causes and Effects of the Variolæ Vaccinæ,* a disease discovered in the Western counties of England, particularly Gloucestershire, and known by the name of cowpox. It was not long before vaccination was being practised in every country of the globe and Jenner received honors from a world much more cognizant of the terrors of smallpox than the present world. Also Jenner was a prophet not without honor in his own country, for a grant from the British Parliament of £10,000 was made to him. Jenner may be aptly termed the father of preventive medicine, while Pasteur, if he did not quite place the coping stone on it, at least carried on and raised the work begun by Jenner to an unprecedented height.

It has been proved times without number and up to the hilt, that vaccination is a great preventive of smallpox. If it does not stamp out the disease its type in countries in which vaccination has been practised is of far less virulence. But a generation has arisen which knew not smallpox as it exhibited itself in the time of Jenner. It was the greatest menace from the disease viewpoint that then existed, and the discovery of the country practitioner of Gloucestershire relieved the minds of the community at large of a dread which like the sword of Damocles was continually hanging over them, a dread which may be compared to a lesser extent to that of cancer in the present day.

No doubt the disregard with which vaccination is now regarded is due to the indifference to smallpox engendered by the fact that little of the disease is seen and when seen is of a mild type. But it is well to point out that there may be a rude awakening from this fool's paradise. Virulent smallpox still exists in certain parts of the world, and if imported into an area inhabited by unvaccinated persons might quickly work dire havoc. A warning of this kind was afforded a short time ago in a riverside district of London, the population of which were largely unvaccinated. Smallpox of a severe type was introduced from the near or far East, in which as an aftermath of the war virulent epidemics are now raging, and the result was that several deaths occurred. This warning was not without its advantages, as there was a rush to be vaccinated. It is feared that the spasm of common sense will, like all such spasms, only last for a short time, and will need another sharp lesson to bring about a recurrence of common sense.

The public may be reminded that vaccination against smallpox, since the introduction of glycerinated vaccine by Dr. Monckton Copeman, is entirely free from danger and thereby it is a bounden duty laid upon the individual that he should protect himself from infection whenever possible, so as not to be a source of danger to his fellow creatures. The life of Edward Jenner and the history of vaccination may be recommended as instructive reading and should dispel ignorance and point a moral.

THE HEART AND RESPIRATORY SYSTEM IN SCARLET FEVER

Although there is little to add to the classical description of endocarditis and pericarditis complicating scarlet fever, that of myocarditis and cardiovascular disturbances has been of late considerably enriched. Scarlatinal endocarditis is rare—according to Broadbent's statistics of 1907 it occurred only in

0.58 per cent. of the cases. It occurs with or without rheumatism, is usually mild but frequently gives rise to a chronic valvular lesion. It can be easily overlooked as the functional symptoms to which it gives rise are usually unimportant. Septic ulcerating endocarditis is rare and usually ends in death. Pericarditis may exist alone or be associated with dry serofibrinous or purulent endocarditis; it is likely to be latent and rapidly retrogresses, but if purulent, death is prone to occur.

As to the functional disturbances of the myocardium there is usually tachycardia at the outset and the older writers insisted upon this symptom as a good diagnostic sign of scarlet fever. The pulse rate varies from one minute to another and there is marked arterial hypotension as well. But instead of tachycardia there may be a relative or absolute bradycardia, although in children this is not frequent. Bradycardia is met with rather constantly at the end of the phase of pyrexia, taking the place of the tachycardia. It lasts for eighteen to twenty days and is of nervous origin, total and without auriculoventricular dissociation. Various types of arrhythmia as well as other changes in the pulse are encountered.

The blood pressure is low in the malignant syndrome of the disease in question and adrenalin exercises a favorable influence. On the other hand, there is hypertension with the acute nephritis of scarlet fever which retrogresses slowly, even when the other symptoms of the renal process have disappeared.

There exist two syndromes which, for that matter, may be combined: First, the myocarditic syndrome which does not always depend upon lesions of the myocardium, being often due to extracardiac causes, especially changes arising in the suprarenals, and secondly, cardiac disturbances due to nephritis. These are often early in appearance and predominating so that the patient seems to be a cardiac rather than a renal subject, presenting edema, enlarged liver, scanty albuminous urine, a small frequent and irregular pulse and an enlarged heart with a *bruit de galop*. In the subacute types all these symptoms are attenuated but become intense if the nephritis becomes chronic.

The complications arising in the respiratory tract in scarlet fever, other than purulent rhinitis, pleurisy and empyema, are hardly mentioned in textbooks. Cases of serious pseudocroup due to the streptococcus have been recorded, intubation being rendered difficult on account of spasm while a reflex may start from the irritated larynx inhibiting the cardiac contractions, hence syncope, sometimes ending in death.

Bronchopneumonia is not uncommon in the more serious cases of the disease while instances of lobar pneumonia have likewise been met with. The predilection of scarlet fever for the serous membranes and fibrous tissue has long been known, hence pleural collections develop in the rheumatic ural processes of the affection with or without endopericarditis. A streptococcal or pneumococcal pleurisy is also known to occur. Finally as an intercurrent complication acute pulmonary tuberculosis or tuberculous pleurisy may ensue, but scarlet fever is not a tuberculigenous disease, therefore these complications are uncommon.

PSYCHIATRY AND DELINQUENCY

"What have psychiatry and psychology to offer as aids in the field of delinquency?" asks Dr. Bernard Glueck in a very interesting and illuminating article on The Psychiatric Attitude in a recent number of the *Survey*. He goes on to say: "If by the field of delinquency is meant the traditional enterprise for the administration of the law, I am afraid these sciences can be of very little aid. Psychology, as the science of the mind and human behavior, and psychiatry, which literally means mindhealing, are tools for different purposes than those reflected in the processes of the criminal law. If we are honest with ourselves, we must say that these processes have refused in the past to have anything to do with questions of understanding and healing. The criminal problem is not kept alive by the occasional offence of a first offender but by an ever increasing element in our population who seem to have accepted criminal behavior as a life career. It is these individuals who may have had repeated contact with the established machinery of the law who attest to the utter failure of these processes to affect materially the problem of crime. But if by the field of delinquency we mean those social service enterprises which have been made possible in spite of certain aspects of criminal procedure, these sciences of human behavior can make themselves felt very decidedly in connection with the administration of the problem of crime. Delinquency, when viewed in an impartial and unbiased fashion, is quite understandable as a problem in human behavior. As such, the workers in this field can at once avail themselves of a fairly well organized and dependable technic for the understanding and direction of human behavior."

Doctor Glueck proceeds to describe in brief this technic. Perhaps the most important element is the psychological and psychiatric attitude toward a problem. Only the inexperienced physician or social worker ever indulges in the holier than thou attitude. Intimate contact with the problems of life and increasing selfknowledge are bound to remove the obstacles to cultivating a proper conception of the understanding and service involved. Another thing to be cultivated is the scientific conviction that "nothing in human behavior happens quite fortuitously and out of a clear sky; that the only way in which one can discover and evaluate causes is to approach a question free from preconceptions." A delinquent act has usually multiple causes. Psychology and psychiatry, more than any other approach to the problem, aim to base conclusions upon an evaluation of all the biological, psychological, social, economic and pathological factors in the case.

Another question as to proper attitude concerns the scope of psychiatry. Once, and sometimes now, the function of this science, in regard to criminology was limited to a statement as to whether or not the delinquent was feebleminded or insane—in other words, was he responsible for his crime? "Now, in actual practice, psychiatry has come to define its task to be that of understanding and treatment of human behavior. The issues of disease or defectiveness are only some of the issues it meets, and as soon as such issues become established in connection with a problem of delinquency, they become problems in medicine and should be dealt with mainly, if not exclusively, from a medical standpoint."

The true scope of psychiatry, then, is to be found in the kinds of facts it deals with. These are, the writer goes on to say, first, the elements of human nature relating to man's inherited dispositions to action and reflecting the history of his descent—in other words, his "biologic destiny"; second, the "acquired or learned equipment of man," enabling him to act and adapt himself of the conditions of life automatically or reflexly. The nature of this acquired equipment is determined, indirectly at least, by innate dispositions, leading their possessor to shun or to seek out certain life experiences. The psychiatrist must recognize the close and important relationship of these factors. "Without such a conception, it would be difficult to account for the real differences in traits and life pursuits between races and peoples, as well as between certain pathologically disposed individuals, like the true epileptic, for instance, and the normal human being."

The next subject with which psychiatry concerns itself is the true evaluation of those circumstances of life common to all individuals, such as the problem of emancipation from the home, of proper self esteem, of sex, and of various other critical times in the life and development of every person, requiring more than the usual adaptive capacity, such as the acute periods of puberty and adolescence, of aging and decline, of grief and bereavement. Psychiatry must study also the actual failures in adjustment and the definite factors involved, such as heredity, injury, infection, exhaustion, emotional insults, bad habits, and other conditions.

"Finally, psychiatry is concerned with the technic of human readjustment and with those positive principles of a hygiene of the mind that might be utilized as preventives of failures in human adaptation and as means towards a more effective conscious control of the human machine. . . . If psychiatry is not making itself more effective in connection with the problem of crime, it is due both to limited opportunity and imperfect technic. But it knows its objectives, and it is up to those who believe in the introduction of a social service point of view into the field of delinquency to see to it that this point of view embraces the aims and technic of psychiatry."

DEATHS FOLLOWING OPERATIONS ON THE NOSE AND THROAT NOT DEPENDENT UPON ANESTHESIA.

We have long been accustomed to attach the minimum danger of death to operations on the throat and nose. Of course we are well aware that the most trivial operation on the human body may be followed by the death of the patient. The doctor may inadvertently operate on a bleeder, the anesthetic may kill the patient, or an intercurrent disease, independent of the operation, may prove fatal, so when a patient dies after such an operation we feel sorry for the doctor, but are not much impressed. But our attention is arrested when Hanau W. Loeb gives us (*Annals of Otology, Rhinology and Laryngology, June*, 1922,) the records of 332 such deaths, and the way in which he collated them. He found the literature on the subject very meagre, so he sent a questionnaire to five thousand physicians who, according to the *American Medical Directory*, profess to be qualified to practise the specialty of nose and throat diseases. Only seven hundred, fourteen per cent., replied, the remainder ignoring his request for information. But this fourteen per cent. furnished him a number which, when added to the few cases in literature and a case of his own, gave a total of 332 deaths, not dependent on anesthesia, which have followed operations of this nature. What the total would have been had the eighty-six per cent. replied must remain a matter of conjecture, but perhaps we are justified in one inference. While it is probable that many of the five thousand listed as specialists are not well trained, mentally alert and conscientious, past experience has shown that those most ready to furnish data concerning their misfortunes are those who qualify best, and among whom the number of fatalities would be least.

An analysis of these 332 fatalities is interesting. The causes of death were: meningitis in 125 cases; hemorrhage in fifty-five; general sepsis in twenty; erysipelas in eight; affections of the endocranium (excluding meningitis) in twenty-six; of the respiratory tract in forty-three; of the heart in five; miscellaneous, twenty; undetermined, thirty.

Meningitis proved fatal in five cases after removal of adenoids and tonsils. In one, the disease was probably present when the operation was performed, in two its onset may have been due to an intervening acute suppurative otitis media, but in two the causal relation could not be explained so readily. The other operations followed by a fatal meningitis were: Intranasal frontal, sixteen; probing and irrigating frontal sinus, seven; ethmoid, with or without resection of middle turbinate, thirty-nine; sphenoid, ten; maxillary, one; resection of middle turbinate, fifteen; submucous resection of the septum, thirteen; removal of polypi, thirteen; combined sinus operation, one; combined submucous and sinus operation, five. In most instances meningeal symptoms appeared within forty-eight hours after the operation.

Death from hemorrhage followed tonsillectomy, with or without adenoidectomy, in forty-three cases; adenoidectomy alone in two; incision of peritonsillar abscess in three; submucous resection in two; sinus operation in four; resection of the inferior turbinate in one. General sepsis was responsible for death after two intranasal maxillary operations, one submucous resection, sixteen tonsillectomies, and one incision of peritonsillar abscess; erysipelas after four submucous resections, two sinus operations, and two resections of the middle turbinate.

Death was ascribed in five cases to brain abscess, in nine to cavernous sinus thrombosis, in twelve to cerebral embolus or hemorrhage, but in only a few of these was the diagnosis confirmed by autopsy. Most of the remaining causes of death tend to give one the impression that the operations were performed on persons unsuited to operation at all and suggest lack of judgment on the part of the operator, but the cause of death was not determined after the following: Tonsillectomy, sixteen; adenoidectomy alone, one; exenteration of the ethmoid, four; puncture of nasomaxillary wall and irrigation of sinus, five; submucous resection, one; resection of middle turbinate, two; combined tonsillectomy and submucous resection, one.

Such a list of fatalities after operations which are commonly considered almost devoid of danger is, to say the least, striking. The mortality risk cannot be great in percentage, but evidently it is considerably greater than it is usually supposed to be. We wish we had space to reprint the reflections with which Loeb closes his paper. The best we can do is to quote a few and urge their careful consideration by anyone and everyone who contemplates performing an operation of this nature.

Knowledge of the anatomy of the nose and throat cannot be learned by operating on the living patient, yet how many try to acquire it by surgery rather than by arduous study in the dissecting room. To operate without this knowledge is impossible for a man of conscience, not to mention the hazard to the patient. The patient himself, not the disease or its name, should be studied to determine whether he is a proper subject for operation and will be benefitted by it. When possible, the operation should be performed in a hospital. Rigid attention to asepsis is essential, not by washing the field with antiseptic solutions or by applying iodine, but by operating with an aseptic organization such as would be used in any other important surgical operation. It is better to take out too little than too much, even if a second operation may be required. Multiple unrelated operations are an abomination. To operate and then to consign the patient to inexpert hands can have no justification. A better surgeon is required to supervise the aftertreatment than to perform the operation.

CHANGES IN METHODS OF TREATMENT

In order to treat a patient with any hope of success, an accurate diagnosis must be made, that is to say, a diagnosis of the underlying cause or causes. If a cure is to be anticipated the treatment of symptoms, while necessary for relief, is comparatively futile. Of course, the ideal mode of treatment is that advocated by Sir James Mackenzie, the preventive treatment par excellence, to diagnose and treat the beginnings of disease, and to nip it in the bud. However, at present, such a course is impossible on a large scale. Not only must medical practitioners generally be educated to diagnose with at least approximate correctness the beginnings of disease, but the public must be educated to consult the medical man for slight ailments. The average individual is averse from doing so. As a rule, he does not call in the doctor until he feels really sick, except when attacked by an acute complaint. Consequently, in the majority of cases the disease has made considerable headway, ere the advice and aid of the physician is invoked, and the problem then is to discover the *causa causans*.

Many of the medical students of the present day do not rise above symptomatic treatment and do not attempt to probe deeper and try to discover the primary origin of any obvious malady. The argument is not advanced that the newly graduated practitioner is not well equipped with medical or surgical knowledge as far as it goes, and the same may be said with regard to therapeutics. He has learned to diagnose the more common affections, as well as the more important of the grave diseases and injuries, and his hospital training has taught him the routine treatment of such. But, as said before, he has not been taught and has not had the opportunity to observe the early manifestations of many serious sicknesses, for the simple reason that persons seldom ask medical or hospital advice for what they consider trivial complaints. In a hospital, routine treatment is usually followed, and the student is not instructed to look for in apparently similar cases a different underlying cause or other causes, and vary therapeutic treatment accordingly, and the reasons for this deviation from accepted methods. If he should be ambitious and keenly intelligent, he will make it his business to learn this aspect of treatment from personal experience, will endeavor to find out the obscure cause or causes, and will found his treatment, therapeutic and otherwise, on the results of his investigation.

Little help in this direction is given by teachers on textbooks except that the cause should always be treated, and it frequently happens that this excellent advice is impossible to follow because the cause cannot be discovered. It may be pointed out that even when the origin of a grave condition is wrapped in obscurity that more can be done in the way of preventing its further progress than is generally conceded, although ignorance of the early cause or causes may exist.

Perhaps there is no more fruitful cause of disease than habitual constipation, in fact it may be stated without incurring the stigma of employing exaggerated language that chronic constipation leading to chronic intestinal stasis is the cause of more fatal diseases than any other one cause. And yet how easy to prevent it in perhaps the majority of cases in its early stages. Cancer usually can be greatly relieved if not cured if taken in time. In any event, life can be prolonged considerably and much suffering avoided if a medical man is consulted and steps are taken when the early manifestations of the disease are observed. The same may be said of a long list of diseases, and the point requires no further elaboration.

Early and accurate diagnosis and early and effective treatment should be the slogans of the medical profession. By these means disease will be largely prevented. But, as it is utopian at present to hope for such an outcome, progress must be steadily made along the path referred to above. The changes made and being made in the practice of medicine are based on sound common sense.

In conclusion, attention may be drawn to the increasing interest now evinced by medical men in the influence of mind over bodily afflictions. It is recognized that the mind is capable of treatment to an extent which it would not have been believed to be capable of but a few years ago.

THE PHYSICIAN'S BEDSIDE MANNER.

A good bedside manner is an extremely valuable asset to the physician, indeed it may even make or mar the fortune of a young medical man. Only a genius or an exceptionally able man can afford to be eccentric; for the man of ordinary ability "dress and address" are strong points in his favor. Some physicians have relied almost wholly for success on a good appearance with suave and pleasing manners, and it may be said with most satisfactory results as far as material prosperity is concerned. The aim of the physician is to gain the confidence of his patient. When this has been accomplished he has made a long step in the direction of restoring the patient to health, that is, when no organic disease exists, and even when such is the case, confidence in the medical attendant is of great value.

It is true that many doctors have made fortunes by their charming bedside manners. Sir Richard Quain used to tell how, when quite a young man, he was called in to assist a well known physician of today. The young man assumed an expression which he thought correct, but which did not impress his senior in the same way, who remarked, "for heaven's sake man don't look like that or they will think you are the undertaker." On another occasion it is related that a doctor after dining not wisely but too well was called hurriedly to the bedside of a certain wealthy society woman. He arrived at the house although considerably bemused, and his first act was to take his watch from his vest pocket to count her pulse. This, however, in his befuddled condition was too much for him and proceeding to replace it he muttered to himself "drunk again." To his astonishment the lady caught hold of his hand and with tears cried out, "Yes I know, but oh doctor, don't mention it and it shall never occur again."

But this is somewhat of a digression from the theme of this editorial, which is to emphasize the value of a good bedside manner. The successful practitioner of the present day, whether specialist or general practitioner, should be something of a psychologist. While manners certainly go a long way with the sick, the personal equation should always be considered. A sick person is sensitive to outward impressions, and while a breezy genial manner may reassure some patients it by no means appeals to all patients. Therefore the doctor should be a psychologist and regulate his manners to accord with the conditions he is called upon to meet. It goes without saying, also, that in order to do the greatest amount of good pleasing manners should be supplemented by knowledge, experience and skill. However, good manners are a desirable asset to the physician in any event and are to some extent within the reach of all.

A CORRECTION

Through an error, Pasteur's photograph appeared in place of that of Weismann in Dr. J. Arthur Buchanan's article on Theories and Theorizers Connected with the Development of the Laws of Heredity, in the preceding issue of the New York Medical Journal and Medical Record. We regret that this occurred. In the reprint of Dr. Buchanan's splendid article the correction will be made and the references in his article will also be included.

News Items.

Medical Society of the County of Erie.—There will be a special meeting of the Medical Society of the County of Erie to discuss the Workman's Compensation Law, Monday evening, March 5, 1923.

Wyeth Memorial Meeting.—A memorial meeting to the late Dr. John Allan Wyeth was held on Tuesday, February 27th, 4:30 p. m., at the New York Polyclinic Medical School and Hospital, 349 West Fiftieth Street. Following the memorial service the building was formally opened for inspection.

Eighth Harvey Lecture.—Dr. E. V. Cowdry, of the Rockefeller Institute for Medical Research, will deliver the eighth Harvey Society Lecture at the New York Academy of Medicine on Saturday evening, March 10, 1923. His subject will be The Significance of the Internal Reticular Apparatus of Golgi in Cellular Physiology.

Rockefeller Foundation Election.—The Rockefeller Foundation has elected to its board of trustees Dr. Ray Lyman Wilbur, president of Stanford University, California, and William Allen White, writer and newspaper editor, of Emporia, Kan.; and to membership on its International Health Board, Dr. David L. Edsall, Dean of the Harvard Medical School.

New York Doctor Opens Discussion.—Dr. Leo L. Michel, of New York City, opened the discussion on the paper by Sir John Thomson Walker, F. R. C. S., entitled Obscure Symptoms Caused by Pyelitis, before the British Medical Association, February 8th. He sailed for home February 24, 1923, after an intensive study of European clinics on genitourinary diseases and rejuvenation.

Annual Meeting of the Eyesight Conservation Council.—The annual meeting and election of the Eyesight Conservation Council of America was held in New York on Tuesday, February 6, 1923, at the Pennsylvania Hotel. President Wallace reviewed the activities of the Council during the past year. He referred to the increased interest and the gratifying response to the work, and of the encouraging outlook for 1923.

American Internal Medicine Congress.—The seventh annual clinical session of the American Congress on Internal Medicine will be held in the amphitheatres, wards, and laboratories of the various institutions concerned with medical teaching, at Philadelphia, Pa., beginning Monday, April 2, 1923.

Practitioners and laboratory workers interested in the progress of scientific, clinical, and research medicine are invited to take advantage of the opportunities afforded by this session.

Lincoln Memorial University Confers Degrees.—At the semiannual meeting of the board of trustees of the Lincoln Memorial University, held in Washington on Lincoln's Birthday, the honorary degree of Doctor of Science was conferred upon Dr. Eugene Hertoghe, of Antwerp, Belgium. At this same time Dr. William Seaman Bainbridge, of New York, received the honorary degree of Doctor of Letters, and Secretary of War Weeks, Secretary of the Navy Mellon, and Dr. John Harvey Kellogg, of Battle Creek, the honorary degree of Doctor of Laws.

Women's Medical Society Meeting. — The Women's Medical Society of New York State will hold its annual meeting 9:30 a. m., May 21, 1923, in New York City. All medical women, members, nonmembers, and their friends are cordially invited to attend both the scientific session and the banquet.

Columbia Appoints Two British Lecturers.—Appointments of British scholars to lectureships in the Law School were announced by the trustees of Columbia University. William Renwick Riddell, Justice of the Supreme Court of Ontario, was named Blumenthal Lecturer for the spring session. Sir Paul Vinogradof, Corpus Professor of Jurisprudence at Oxford University, will be Carpentier Lecturer for 1923-24.

College for Rehabilitation.—At a meeting held at the Academy of Medicine of New York, a company was incorporated for the establishment of an American College of Rehabilitation for training workers in the field of reconstruction of the wounded and crippled. Major Franklin W. Johnson, of Columbia University, described the rehabilitation work carried on during and after the war among disabled soldiers. The work is a combination of surgical and social. Its sponsors are Dr. Fred. H. Albee, Mrs. Clarence Cary, Martin A. Metzner, W. J. Hoggson, R. Gradwell, and Standish Chard.

David E. Hoag Reappointed.—Dr. David E. Hoag, who was commissioned as captain in the Medical Corps, United States Army, in the World War, and who was honorably discharged, has been reappointed by the President, through the Adjutant General of the War Department, as Captain in the Medical Reserve Corps, Second Corps Area, Seventy-seventh Division, United States Army. Dr. Hoag is lecturer in the department of nervous and mental diseases in the New York University and Bellevue Hospital Medical College, associate neurologist at the Post Graduate Hospital, and associate visiting physician to the New York Polyclinic Hospital.

Radiological Award.—The Radiological Society of North America has awarded its gold medal "for distinguished services to the science of radiology" to Dr. Percy Brown, a prominent physician of Boston for the last twenty years, now an associate of the Jackson Clinic at Madison, Wis. The presentation was made at a meeting of the society at Detroit. The society's medal was awarded on the same occasion to Dr. Marie Curie, discoverer of radium, and to Dr. Maud Slye, of Chicago, and Dr. Gosta Forssell, of Stockholm, distinguished scientists in the field of radiology.

Reunion of the Blizzard Class.—On March 12th the Class of 1888 of Bellevue Hospital Medical College will celebrate its thirty-fifth anniversary. Because of its graduation on the day of the most terrible blizzard New York ever experienced, the class was named by the late Professor Doremus "The Blizzard Class." Dr. D. Hunter McAlpin, the class president, has invited all the surviving members to be his guests at a dinner to be given on this coming March 12th at the McAlpin Hotel. Those of the class who have not been reached by direct invitation because of faulty or insufficient address, will please communicate with the acting secretary, Dr. S. Adolphus Knopf, 16 West Ninety-fifth Street, New York City.

VIENNA LETTER.

(*From our own Correspondent.*)

Vienna, *January 11, 1923.*

INFANTILE SYPHILIS.

Dr. Bókar reports the statistics of the medical clinic of Budapest, from the years 1880 to 1915, regarding infantile syphilis. Altogether there were 174 cases of which forty-two were acquired and 132 hereditary. Of the forty-two acquired cases, the source of infection could be determined in twenty. In these forty-two cases, five patients died in the clinic, one of pneumonia, one of gastroenteritis and three of infectious diseases. Twenty-two patients lived to adult life; fifteen passed from observation. In one case the patient had tertiary symptoms at the age of eleven. The others, with the exception of occasional diseases, remained well. Of these twenty-two patients ten were men, most of them married, had families, and all the children were healthy. Of the twelve women seven are married, and four of them have no children. One of them had one child that died at the age of three years. Another had had eight children, of whom six are still alive. All the children were fairly intelligent, and showed no moral or physical defect.

In the 132 cases of hereditary syphilis, fifty-nine patients were males and seventy-three females; forty showed symptoms of the disease very early and ninety-two not until the fifth year. Of the forty cases of precocious hereditary syphilis nine patients passed from observation. Of the remaining thirty-one patients, twenty-one died in early childhood, and one at the age of eighteen of abdominal typhus. This patient was apparently quite intelligent. Of the remaining nine patients only two are still alive. One of them was morally defective and his parents were the same. The other was fairly intelligent, married, and has two living children. Of the ninety-two cases of late hereditary syphilis, eleven males died up to fifteen years of age. One of these was remarkably intelligent; some of them were morally defective. Four patients died at the ages of seventeen to twenty years. The causes of death in all cases may have been syphilis. As for the other patients, it appears that, as far as was known, they are all married and have children that are fairly healthy. Among the women there can be no doubt that there was some delay in the appearance of puberty. Of the forty-nine children born up to 1910 eight had died. There were also numerous miscarriages.

MIGRAINE PSYCHOSES.

In a recent meeting of the Vienna Neurological Society, Dr. Hirschfeld discussed the relation of migraine to epilepsy, hysteria major, and mental diseases. He said that simple hemicrania sometimes produced mental irritation or depression, anger or slight hallucinations, with migraine of an epileptic type with muscular twitchings or ocular manifestations. Can a visual aura precede an attack of migraine as well as true epilepsy? Special proof of the epileptic nature of migraine is noted when the visual aura assumes a red color. Abortive attacks can occur in both, or one be substituted for the other. Psychical symptoms or a psychical equivalent can occur in either. A transitory psychosis sometimes follows or accompanies migraine. This is important from a therapeutical viewpoint, indicating the necessity of an antiepileptic treatment for migraine.

In the same way Dr. Hirschfeld holds close clinical relations between attacks of migraine and hysteria major.

Several types of cases are met with, he said. 1. A continuation of hallucinations of sight, confusion, amnesia or ataxic aphasia, with attacks of migraine lasting several hours. 2. Confusion with religious delirium. 3. Hemicrania with temporary blindness, paresthesia of a hand, later visions of pictures, animals, and speech disturbances. 4. Hemicrania after mental shock with anxious delirium, and disturbance of consciousness for three days. The occurrence of these psychoses is, however, rare.

SMALLPOX EPIDEMIC IN BULGARIA.

Since the second half of November, last year, outbreaks of smallpox in about fifty localities in the south part of Bulgaria have ceased; and in twenty-two, or forty-four per cent. of those outbreaks the disease was restricted to the one household where the first case occurred. Notwithstanding this record of effective work by the health services, State and local, disease has continued to spread, because in the other outbreaks where the disease was not restricted to the first household, it was first called a pustulous eczema, itch, furunculosis, syphilis, impetigo, acne and not reported to the health officers so that restrictive measures could be taken. In a few instances the fault has been with the health officer himself. Because of such lack of proper reports or proper action, smallpox continued to spread. During the present epidemic the greatest number of places at which the disease was reported present, in any one week, occurred in the week ending December 23.

The Health Department of the country has sent a circular to all directors and managers of colleges, private and public schools, and convents, stating that they must insist on receiving a certificate of successful vaccination from each child before it is allowed to attend the sessions. Prompt prosecution in the recorder's court is threatened for every violation of the law.

STATUE OF PASTEUR IN BUCHAREST.

In the city of Bucharest, capital of the Roumanian Kingdom, there was recently dedicated with suitable ceremonies a statue of Pasteur, after the design of a notable sculptor. The statue is to commemorate the one hundredth anniversary of Pasteur's birth. The statue stands on the chief promenade of the city. In another Roumanian city, Oradea-Mare, a large street, leading to the hospitals and sanatoria of the city, has been named after Pasteur, Strada Pasteur.

REGULATIONS CONCERNING MEDICAL EDUCATION IN JUGO-SLAVIA.

The Jugo-slavian State Board of Health has drawn up a schedule of minimum requirements for the regulation of medical colleges. The conditions of admission to lecture courses are: 1, A certificate of moral character, and, 2, evidence of preliminary education, of which a high school maturity certificate (diploma) represents the minimum requirement. Admission to advanced standing is based upon an equivalence of work done in other institutions recognized by the State Board. The curricula of the medical schools are to embrace four years of instruction, and one year practice in dressing rooms, operating theatres, obstetrical wards, and in clinical wards, aggregating at least fifty months. The branches of medicine to be included in the course of instruction must include at least the following: 1, Anatomy; 2, physiology; 3, chemistry; 4, physics; 5, materia medica and therapeutics; 5, theory and practice of medicine, including ophthalmology, otology, dermatology and neurology; 6, pathology and bacteriology; 7, surgery, including orthopedic surgery; 8, obstetrics; 9, gynecology; 10, hygiene; 11, medical jurisprudence (forensic medicine). The regulations also prescribe dissection, lectures, clinical courses, and regular attendance on the part of the student.

LONDON LETTER.

(*From our own Correspondent.*)

London, *January 23, 1923.*

THE BORDERLINE OF SANITY.

The Middlesex Hospital, London, is about to inaugurate a new departure in this country in hospital treatment. The board of management has decided to open two wards for the special benefit of mental cases in an incipient stage. By arrangement, the patients will be attended by the members of the medical staff of St. Luke's Hospital, the large hospital for the treatment of mental disorders in London. It may be said that under the present British Lunacy Act no provision is made for the treatment of borderline cases, which are frequently of physical origin, or into which the physical factor enters, and which may be treated effectively in the early stages. In any event, the beginnings of mental disorders offer a wide field for systematic investigation, as it is obvious that reforms in the methods of treatment are urgently called for. Intelligent treatment of mental cases is lacking, but recognition is coming that certain forms are susceptible of relief and cure. Therefore, the new departure of the Middlesex Hospital is an encouraging sign of this recognition.

AN EPIDEMIC OF INFLUENZA.

Influenza is widespread but up to the present time is of a mild type, few deaths having been recorded as the result of the disease. In fact, the medical correspondent of the *Times* thinks that there is nothing in the official mortality figures for London to support the idea that the present epidemic deserves the name of influenza which it is generally receiving. The outstanding features, while they vary considerably, are pain of the neuralgic type, a tendency to giddiness, nausea and loss of appetite. The existing outbreak is distinguished by its nervous symptoms and perhaps is the nervous form of a disease which manifests itself in protean forms. At any rate, as yet it is far from deadly, although it is not wise to make definite statements at so early a date. Another feature is a tendency to a rash, which appears on the face and chest, which rash often reappears when a relapse is at hand.

THE PROBLEM OF THE ILLEGITIMATE CHILD.

An influential deputation in regard to the children of unmarried parents bill is soon to be received by the Home Secretary. The death rate of illegitimate children is at least twice as large as that of legitimate children. The fundamental reason for the suffering and dying among such infants is that as soon as an unmarried woman knows that she is pregnant, she is anxious, unhappy, and overcome by every kind of trouble, emotional, physical and economic. The result of the policy pursued in this country is to make the mother the sole support of the child. If a working woman, and the majority of illegitimate children belong to this class, she must not only earn her own living but that of the child. The principle underlying this policy is a deterrent. However, it has failed in this object. There are more illegitimate children born now than ever before, though it has helped to maintain the high death rate and damage rate among the children who are born out of wedlock. In short, there has come to be a very general measure of agreement among those who have studied the question most closely that plans must be changed and the endeavor must be made to compel the father to share the responsibility for the maintenance of the child. An effort must be put forth to try to divide the economic burden more evenly between the parents. Legislation in most civilized countries has been based on this idea, which should give a better chance to the child and should also help to discourage the tendencies towards irresponsible fatherhood. In these days healthy children are a valuable asset to a country, and the presence of a considerable number of illegitimate children, reared and brought up in the conditions usually encountered, is a drawback and a disgrace. It is only in England and Wales of the countries of Europe that it is impossible to legitimatize children by subsequent marriage, and it is hoped that this may be made law in England and Wales. Of all the branches of preventive medicine none is of more importance than child welfare, and it is against the dictates of commonsense that because a child is illegitimate it should be excluded from the benefits of this system.

OBITUARY.

John Tames Pringle, M. D., C. M. Edin., F.R.C.P. Lond., Consulting Physician to the Skin Department, Middlesex Hospital, died at Christchurch, New Zealand, early in December last. He was born at Lannhall, Dumfrieshire, in 1855, and graduated in medicine and surgery at the University of Edinburgh in 1876, taking the M. R. C. P. Lond. in 1884. He was elected a Fellow in 1891. He came to London and joined the Middlesex Hospital in 1883. He was one of the best British dermatologists and a remarkably good diagnostician. As a man he was one of the kindliest, possessing a true genius for friendship. The tales of his charitable acts would almost fill a volume. His work during the war irreparably injured his health, which was never strong, and the voyage to New Zealand was taken as a last desperate chance, but proved futile.

Book Reviews

THE PROPER FEEDING OF INFANTS AND CHILDREN

The Physiological Feeding of Infants and Children. A Handbook of the Principles and Practice of Feeding. By Eric Pritchard, M.A., M.D. (Oxon.), M.R.C.P. (Lond.). Fourth Edition, Entirely rewritten and Enlarged. With Illustrations. London: Henry Kimpton, 1922.

Reviewing is an art by itself. There are reviews and reviews. Some socalled reviewers read the introduction to a book, perhaps glance through the book and pick out a special point or two and then proceed with the review. Some reviewers are nauseatingly fulsome, while others are acutely critical. It goes without saying that it is some advantage to the reviewer and those who read his eulogies, diatribes, or what not, that he should know something of the subject on which he discourses so fluently. Perhaps it is a handicap to know too much, however, for he who possesses an expert knowledge is inclined to be too critical of another man's work in the same direction. The reviewer of Dr. Pritchard's book is not hampered in any of these ways. He knows something of infant feeding, enough to appreciate good writing on the subject, but his knowledge is not so extensive or intimate as to prejudice him in advance against the views of other authorities or would be authorities, and he has an open mind.

This is a fourth edition of Dr. Pritchard's book, which fact, in itself, says something for its worth. It must be understood that the author holds somewhat original views with regard to the proper mode of feeding infants and children. He is called a man of an original mind by those in agreement with his opinions and a crank or faddist by those who disagree or who desire to propagate their own views. For instance, for many years Dr. Pritchard has preached the doctrine, in and out of season, that, as a rule, children and infants are fed too generously, especially babies. It has been a long held belief that infants and young children thrive on "stuffing," that their powers of digestion and assimilation are prodigious, and that it is foolish in the extreme to inveigh against the good old custom of giving a baby something to eat whenever it cries. It is not understood that the little one more frequently cries because it has had too much rather than not enough.

The quantitative question is, perhaps, the keynote of the book, although, of course, due importance is paid to the quality of diet, times for feeding, and so on. The book is based on science reinforced by practical common sense. The author recommends that children be fed according to caloric requirements, but with no slavish adherence to this principle. Such requirements should be regarded from the viewpoints of age, weight, rate of growth, energy production, loss of heat, and various conditions of environment. A physiological basis also must decide the ratio or balance between the different food constituents. From this point of view food should be selected from the aspects of taste, digestibility, absorbability, physical qualities, and variety. Owing to the fact that the last edition of this book was published in 1909, it is obvious that opinions on infant and child feeding have undergone some revision and modification. During the past twelve years the subject has been investigated and threshed out as never before, and it stands to reason that some previously held views have been relegated to the dust heap, or nearly so. Perhaps the most radical change of opinion that Dr. Pritchard has been impelled to make is that he now concludes that it must be wrong to increase the protein content of the food, as the child grows older. He argues thus that breast milk, which is admittedly the best food for infants, does not contain a larger protein content as lactation proceeds for eight or nine months. He thinks the contention that because infants cannot at first digest the full proportion of protein they must necessarily be deprived of their nutritional rights, is just as unsound as it is to assume that when artificially fed infants have developed the capacity for digesting protein they require a larger proportion than is present in breast milk itself. The quantitative basis of feeding is dealt with in respect to children over as well as under one year of age, with due regard to the potent point that knowledge is incomplete with respect to the metabolic processes of children, especially in disease.

However, unfortunately, there is no space here to discuss this book in the thorough manner it deserves to be discussed irrespective of the already acknowledged limitations of the reviewer. But before ending, there are a few points to which attention should be drawn. One of these is the effects of intestinal toxemia in childhood. It may be interpolated here that Dr. Pritchard was one of the first physicians in Great Britain to point out that this condition occurred fairly frequently in infancy and childhood and was the cause of a great deal of ill health and disease, but he holds that constipation or delayed transit are not serious causes of intestinal toxemia in infancy, and so far as the association of intestinal toxemia and constipation is concerned, reliance must not be placed on effecting a cure by insuring regularity of the bowels. Putrefaction or fermentation occurs in the bowel contents when from any reason the food consumed is not digested in the proper place, at the proper time, or at the proper rate by the normal physiological enzymes in the bowel. Among the means for preventing or successfully treating this, dietetic measures hold the first place. Also efficient disinfection of the bowel is recommended.

In the opinion of the reviewer the most valuable chapter of the book is that in which malnutrition and disturbances of metabolism are discussed. Of course, the most important, or at any rate the most greatly talked of condition, coming within this category, is rickets, which rightly enough Dr. Pritchard does not class among the socalled deficiency diseases, that is, deficiency diseases in the narrow sense, those which are deficient or lacking in one or other of the vitamines. Neither does the author assert that the vitamines have little or nothing to do with the causation of rickets, nor does he lay the blame, as many do now, on faulty hygiene and term it a disease of environment. On the contrary, he takes the eminently common sense viewpoint that all these elements are involved to a greater or lesser extent, and that the essential precursor of rickets or the true rachitic state is acidosis and he would prefer to limit the term rickets to the clearly cut syndrome of the three cardinal or pathognomonic symptoms, with a qualifying and distinctive epithet to signify the particular etiological group which is responsible for the causation. For instance, one might speak of an ineffective type, a vitamine type, an endocrine type or a dyspeptic type. A diagrammatic chart included in this chapter clearly represents the causative factors and symptoms of rickets.

The whole book is a well written, plainly phrased exposition of the author's view and, as said before, is distinguished, held in check, and tempered by common sense. The illustrations and diet sheets are to be commended while the appendix is positively a vade mecum for those who desire to feed infants and children on those foods which are best calculated to suit them. The caloric value of different foods is given and the methods of preparing certain foods for infants and children. The work from beginning to end is not only scientific and practical but teems with useful information. It is, moreover, an excellent example of the printers' and binders' craft.

DISEASES OF CHILDREN

The Diseases of Children. Medical and Surgical. Illustrated. By The Late Henry Ashby, M.D. (Lond.), F.R.C.P., and The Late G. A. Wright, B.A., M.B. (Oxon.), F.R.C.S. Revised by Hugh T. Ashby, B.A., M.D. (Camb.), M.R.C.P. (Lond.), and Charles Roberts, M.B., B.S. (Lond.), F.R.C.S. Sixth Edition. Thoroughly Revised and Rewritten. Oxford Medical Publications. London: Henry Frowde and Hodder & Stoughton, 1922. Pp. xxvii-769.

Many years have elapsed since the appearance of a former edition of this textbook. Pediatrists and general practitioners will welcome the present sixth and revised edition. Much progress has been made in the field since the appearance of the last edition in 1905 and most of the text had to be revised. All in all, it is a new book and a worthy one as a standard textbook. In some respects it differs from some American conclusions, in regard to feeding, for example, but these very differences deserve careful consideration.

FRACTURES

On Modern Methods of Treating Fractures. Including the Jacksonian Prize Essay on Bone Grafting. By Ernest W. Hey Groves, M.S., M.D., B.Sc. (Lond.), F.R.C.S. New York: William Wood & Co., 1922.

Like all new works and new editions this book contains a great mass of information derived from the war experience. In gleaning the knowledge here embodied the author had the advantage of close associations with Sir Robert Jones and his pupils. The author believes that the study of fractures, their mode of production and their management, should constitute a specialty as distinct as those dealing with diseases of the eye, throat, or other parts of the human frame, and "until fractures cease to be the mere encumbrances of general surgical wards, no great progress can be made in knowledge, treatment, or teaching." The book is very profusely illustrated in black and colors, and we may add, appropriately illustrated, not one of them being superfluous or introduced merely for effect or as padding. Groves has definite opinions of his own regarding the treatment of fractures and he does not hesitate to express them, but he has also been hospitable to the views of others and describes very fully and satisfactorily the various methods advocated by other surgical authorities. The book should find a place in the library of every man in general surgical practice or whose field of activity is more or less remote from medical centres, for it will on occasion be found a friend in need.

CARDIOLOGY

Diseases of the Heart. By I. Harris, M.D., L.R.C.P. (Ed.). New York: William Wood & Company, 1922.

The avowed object of the book is to give a complete account of cardiology, old and new, in as concise a form as possible. In effect, the author confines himself to a didactic presentation of the elementary facts concerned in the diagnosis and treatment of diseases of the heart. The references to cardiac physiology and pathology are scanty. A number of statements presented as facts will be questioned by many. For instance, that a systolic pressure of 160 is invariably due to kidney trouble; that rheumatic endocarditis is caused by a streptococcus and may be either simple or ulcerative. Completeness has often been sacrificed to brevity. Thus no mention is made of the thrill in aortic stenosis. The note on the employment of quinidine in auricular fibrillation is too short to be of value to one not acquainted with more detailed accounts of its use. No references to the literature are given. The book may have some value as a quiz compend for medical students.

COLLOIDAL SOLUTIONS

The Physical Properties of Colloidal Solutions. By E. F. Burton. Longmans, Green & Co.

The second edition of the *Physical Properties of Colloidal Solutions* has been thoroughly revised and the subject matter brought strictly up to the date of publication. Recent advances in the knowledge of colloidal chemistry have made it necessary to rewrite entirely certain parts of the book. The volume is intended primarily for the student of physics, and the author has emphasized the relation of colloids to the development of physics. A considerable, but not undue, space is devoted to the discussion of the purposes and use of the ultramicroscope, and to the confirmation of the kinetic theory of matter afforded by the study of Brownian movement. The student of chemistry, as well as the physicist, will be interested in the chapters dealing with the phenomena of the charge possessed by the colloid particle, surface tension, and the mechanism of coagulation. The latter subject is discussed in the light of the latest studies, and the chapter has been entirely rewritten. The section dealing with the practical applications of colloidal solutions is unfortunately short, but as the author writes in his preface, this topic requires a whole treatise in itself. The volume under review is one of a series of monographs on Physics, and maintains the high standard set by the earlier issues.

BIOLOGICAL SOCIETY OF BARCELONA

Treballs de, la Societat de Biologia. 1919. Publicacions de l'Institut de Ciències. Publicats sota la direccio de A. Pi Suner. Barcelona: Institut d'Estudio Catalano, 1919.

Thirty-five papers were read before the Biological Society of Barcelona at its various sessions during 1919, the transactions being as usual published in Catalan Spanish. The society has at present forty-seven active members, of whom twenty-five read papers alone or in collaboration. The subjects show notable variety, and some of interest to the clinician are devoted to spirochetosis, uterohemorrhagica, gas gangrene, syphilis, tetanus, spastic paraplegia, anaphylaxis, the peptone treatment of infections, influenza, pyocyaneus infections, and glycosuria. Others deal chiefly with problems of embryology, physiology, and biochemistry. The most significant title deals with the intratracheal injection of antipneumococcus and antistaphylococcus serum in the pulmonary complications of influenza by Bossan. The author punctures the larynx and throws the serum directly into the trachea. He relates five cases in which the treatment caused a brusque defervescence. In two others the patients were in extremis. In the other eight the patients recovered, but the author does not regard the latter of crucial importance, for they would doubtless have recovered in any case.

REGIONAL ANESTHESIA

Regional Anesthesia. Its Technic and Clinical Application. By Gaston Labat, M.D. With a Foreword by William J. Mayo, M.D. With 315 Original Illustrations. Philadelphia: W. B. Saunders Company, 1922.

Europe is somewhat in advance of America in the use of the various methods of injection anesthesia, probably owing to the better control of the patient abroad and the complacency of the latter. William J. Mayo, in his foreword to this book, says that he does not look forward to the day when regional anesthesia will wholly displace general anesthesia; but undoubtedly it will reach and hold a very high position in surgical practice. The fact that there is a chair of regional anesthesia in two of the leading teaching institutions of the country shows that this field of practice is pregnant with possibilities.

The author aims to impart the means of acquiring rapidly a practical knowledge of regional anesthesia and he does this in a most approved manner, basing his work on a personal experience gained in thousands of cases. This is a field of practice where practical experience and a thorough knowledge of anatomy are absolutely necessary. It is of such broad application that it needs no wide stretch of imagination to see the possibility of regional anesthesia becoming a specialty in itself. The surgeon of the future must either master it himself or cooperate with a specialist in regional anesthesia.

The author divides the entire body into various regions from the viewpoint of nerve distribution. The choice of the operation is left to the surgeon. The most detailed instructions are given as to the method and technic of the various procedures. The surgical anatomy of each part to be anesthetized is given in detail. The illustrations are original, very apropos and most instructive and the language is direct. The book is intensely practical. Special chapters are devoted to otology, rhinology and laryngology, urology and dentistry. The technic of intraspinal block, socalled spinal anesthesia, is also discussed in full.

The results obtained with this form of anesthesia are well worth the time and effort spent in acquiring its technic, which should be mastered by everyone attempting to do major surgery. Future progress in anesthesia undoubtedly lies in this direction. The scope of the operations possible with regional anesthesia depends upon the experience of the surgeon. It reduces the operative prognosis to a minimum by not affecting the vital functions of the main organs of the body and also the direct inconveniences and dangers of inhalation anesthesia; it also forces gentleness in the handling of the tissues on the surgeon. Novocaine, in strengths of 0.5 to two per cent., is the anesthetic drug of choice, the strength varying with the nature and region of the operation.

THERAPY

Grundriss der klinischen Therapie innere Krankheiten. Von Prof. Dr. Georg Klemperer, Director der IV medizinische Universitätsklinik, ärztl, Direktor des städt. Krankenhauses Moabit in Berlin. Price 108 marks. Berlin and Vienna: Urban & Schwarzenberg, 1922.

The author, with whom Dr. L. Dünner has collaborated in getting out the present volume, divides his subject matter as follows: general treatment of the sick individual; infectious diseases; diseases of the digestive, respiratory, cardiovascular, renal, hemic, arthric, and nervous systems, disorders of metabolism and poisonings. A formulary is appended. The author has for many years edited the periodical *Therapie der Gegenwart*, and is one of the best known therapeutists in the world. An extensive formulary is appended.

CONDUCTIVITY AND PERMEABILITY

Injury, Recovery and Death, in Relation to Conductivity and Permeability. By W. J. V. Osterhout. Philadelphia and London: J. B. Lippincott Company. Pp. 20-259.

This book may to many seem to be a useless task —for the present. But there is no doubt that work of this character is going to help us some day solve, if not the problem of life, at least some of the more fundamental underlying factors. The scope of usefulness of this monograph will increase as our knowledge broadens. For the present we can only study the results as set forth on the chance that they may give us clues to which we can add or that they may serve to stimulate us along to further efforts at the solution of that great mystery, life.

PIRQUET SYSTEM OF NUTRITION

An Outline of the Pirquet System of Nutrition. By Dr. Clemens Pirquet. Philadelphia and London: W. B. Saunders and Company, 1922. Pp. 96.

An authoritative statement of the Pirquet system of nems, including the nutritional treatment of tuberculosis and feeding as preventive medicine. Much of this material has appeared in the New York Medical Journal and, no doubt, our readers will welcome the appearance of this useful monograph.

MIND ENERGY

Mind Energy. By Henri Bergson. Translated by H. Wildon Carr. London and New York: Macmillan & Co., 1921.

Diverse topics are discussed in this series of essays. Some of the themes were first presented as far back as 1901 (*Dreams*) yet in every instance much will be found that is valid and full of interest. Few philosophers, with the exception of James, have had so much in common with the medical man. A more appropriate title for Bergson would be a philosophical psychologist. Most farreaching are his ideas on consciousness, and his working out of the unconscious which is so important in the understanding of modern psychopathology.

The chapter on memory of the present and false recognition takes up an interesting study which has engaged the minds of most leading psychiatrists in the past. Bergson's hypothesis is ingenious. His style varies from brilliance to an involvement of presentation most difficult to grasp and untangle. How much of this is due to difficulties of translation is hard to say. On the whole, the book may be classed as a distinct contribution to the realistic school of philosophy.

DIAGNOSIS OF NERVOUS DISEASES

Diagnostica delle Malattie Nervose. Dott. G. Mattirolo. Libero docente di Patologia Medica e di Neuropatologia in the University of Torino. Torino: Unione Tipografico-Editrice Torinese, Milan, Naples, Rome, 1920.

This book offers a well outlined presentation of the anatomy of the nervous system and of the localization of disease processes within it. In concise form it sets forth the forms of disease to which the nervous system is subject. Its manner is such as to make this knowledge most accessible to the practitioner who needs just such aid in his frequent duty of diagnosing such conditions. It forms a useful reference book for ready consultation by anyone interested in the structure, function and pathology of the nervous system. It does not attempt more than a brief entrance into each portion of its subject. Yet merely in the way of stimulus in that direction it should have laid more emphasis upon the psychic background of nervous disorders. This is always, and in hysteria most especially, to be considered.

MAN'S SUPERSTITIONS

The Origin of Man. By Carreth Read, M.A. Cambridge University Press, 1920.

Read has given us an unusual contribution on the superstitions of man. His basic approach is anthropological, yet he considers carefully the psychological and philosophical aspects. To call Read a pessimist would be unfair, yet it would not take much to make him one. This does not mean that he has not made a most valuable contribution. His book is replete with well selected data of value which he has considered with care and worked up into a valuable whole. He is at variance with most anthropologists regarding the priority of animism and magic. The evidence, as he presents it, sounds plausible. Read has a faculty of placing his finger on the shortcomings of man's development. He fears we have clung too long to archaic beliefs and in so doing have prevented our own development. When we consider the furore made over a sorcerer like Coué, we are inclined to agree with him, but when we examine the growth of modern analytical psychology, we feel that man will soon come to a better understanding of self and so be able to rid himself of his regressive superstitions.

On the whole, Read's book should receive careful study as it is a real contribution to the history of human thinking and belief.

MENTAL DISORDERS

Mind and Its Disorders. By W. H. B. Stoddart, M.D., F.R.C.P. Fourth Edition. Philadelphia: P. Blakiston's Son & Co., 1922.

The author's mind has been in a state of revision and he has been honest enough to admit it and revise his book accordingly. For this reason, and because he is one of the best grounded psychiatrists, his book is one worthy of careful consideration. In this, the fourth edition, numerous changes have been made as the author gives increasingly more credence to psychological rather than to organic causes in the formation of the psychoses and psychoneuroses. In many instances he still clings to older concepts but not as tenaciously as formerly. In all it is a good book by a very big man.

MEMORY

Remembering and Forgetting. By T. H. Pear, M.A., B.Sc. New York. E. P. Dutton & Co., 1922.

A description of memory as formulated by the psychoanalytical school. An attempt is made to temper some of Freud's concepts by the use of terms designed by the late W. H. R. Rivers. A considerable amount of experimental psychological material is introduced. If the book can be classified it should be placed in the transition group standing between the old and new psychologies. The author has been reluctant to give up the old and somewhat timorous of accepting the new.

ITALIAN SURGERY

Modern Italian Surgery and Old Universities of Italy. By Paola De Vecchi, M.D. New York: Paul B. Hoeber, 1921.

An interesting description of the surgery of the modern Italian School is this volume, in which Dr. De Vecchi describes many methods recently devised in Italy, some of them in detail. Of especial interest is the cosmetic operation of Vanghetti, which aims to preserve the amputation stump so it may be usefully employed after the operation. The book is attractive and should be of great interest to the American surgeon.

REFERENCE HANDBOOK FOR MEDICAL OFFICERS

An Outline of the Medical Service of the Theatre of Operations. By M. A. W. Shockley. Philadelphia: P. Blakiston's Son & Co., 1922.

This is a book designed for reference for the line, general staff and medical officers. It is purely technical in its scope and conforms with the new army organization and new medical service nomenclature. The book has undoubtedly been worked out through the organization of the medical staff.

PASTEUR INSTITUTE MONOGRAPHS

Monographies de L'Institut Pasteur. Pneumocoques. Et Affections Pneumococciques. L. Cotoni, C. Truche et Mlle. A. Raphael. Paris: Masson et Cie, 1922.

This monograph presents a summary of the researches carried on in Nicolle's laboratory during recent years. The work is divided into three parts—the first one dealing with the bacteriology and immunology of pneumococci; the second part with the distribution of pneumococci and the diseases which they may provoke; the third part with the treatment of pneumococcal infections. The material is very well presented and contains abundant references to the literature. It is particularly interesting to note that their studies do not support the idea of the four distinct groups of pneumococci, which have been described by American observers. Their studies of active and passive immunity lead them to believe that there are no distinct types of pneumococci. The groups that have been described are characterized only by their agglutination reactions but not by their antigenic powers. All pneumococci contain the four antigens. Agglutination is a poor method of recognizing these antigens. Thus a powerful type I serum may cure patients who are suffering from a pneumococcal infection of a different type. In the last part of the book the serotherapy is discussed and good results are reported from the use of antipneumococcus serum prepared along the lines pointed out in their researches.

A NOVEL OF THE CIVIL WAR

Proud Lady. By Neith Boyce. New York: Alfred A. Knopf, 1923.

There are several features of this novel of the Civil War that raise it above the commonplace "good" novel of the present day. It is a study of two characters, each distinctive for reasons well understood by the author. They marry; they struggle for years to reach an adjustment. Their married life is the typical life of thousands—content enough outwardly, yet hampered by inward strife, dissatisfaction. They realize too late that their mating had been preordained; that they were capable of true happiness in their love life. It is the breaking down of their love life and the lonely years following upon the crash that brings them to knowledge. And then, of course, it is too late, for the bulwark of pride, injured selfrespect, socalled, takes the place of the stubborn adolescent ignorance to which they cling for more than half their wedded life.

The girl as a result of her mother's training is a repressed puritan. The man coming back to his betrothed after the Civil War has undergone the same growth that is causing constant new problems for the present generation. Naturally they can no longer meet on a common basis. They compromise and drift along, each leading a separate inner life that has no contact with that of the other. We have not progressed very far beyond this same picture. For that reason the story will long endure as a careful history of marriage as it has been for many years and as it will remain for many years longer, unless the bonds of tradition, convention, the lying outwardness of "good form," can be broken to let reality of feeling, emotion, honest selfknowledge reign in their stead.

DITTE

Ditte—Daughter of Man. Ditte—Towards the Stars. By Martin Anderson Nexo. Translated from the Danish by A. G. Chater and Richard Thirsk. New York: Henry Holt, 1920.

The tragedy of Ditte, begun so appealingly in *Ditte—Girl Alive,* unfolds through these two latest powerful volumes. The inevitable life pattern followed by the little illegitimate girl is reiterated through her years of service, toil, misfortune. Through it all she carries her heart of gold. But it is of no avail. The frightful conditions of the very poor in any European city overwhelm her just as countless other victims of our age of exploitation. The pictures of conditions in farmlands in Copenhagen among the poor everywhere, in short, are ruthless. They haunt one. They *must* awaken the slumbering spark of humanity in us. As a propagandist Nexo is indeed a moving spirit. May his long struggles for better conditions among the working classes in his country be at last crowned by success!

Perhaps it is the very mother spirit in these unfortunates that makes the struggle increasingly difficult. From the outset they accept their inferiority. Self-sacrifice, intolerable hardship, helpless victims of life, they make no effort. It is preordained. They are passive and suffer in silence. Pelle's genius crested a wave of progress in the struggle. An advance was made; one of the rhythmic manifestations of natural ebb and flow of economic conditions. Already in Ditte's day and neighborhood the apathy is growing. The tide shrinks back from the outposts Pelle has set up leaving them as silent tombstones of a hope.

LONDON

The London Spy. By Thomas Burke. New York: George H. Doran Company, 1922. Pp. 324.

A misleading title for a charming book. Whimsical sketches of spots in London here and there, of people, celebrities and those obscure in their own circle are done in the inimitable Burke fashion. There are anecdotes which sparkle with a dry humor and of interest to Americans. if not to every one, is a short, intimate psychological portrait of Charlie Chaplin. There is also a sketch of a London cinema studio which throws some new light on the character of the people engaged in the work and of the work itself. Burke is a keen observer; his philosophy mingles with his studies making the reading of his books both profitable and enjoyable.

HISTORY

The Story of Mankind. By Hendrik Van Loon. New York: Boni & Liveright, 1921.

Van Loon has animated history both in his manner of telling it and by his pungent illustrations. His book is written for children but no one can read it without having a finer vision of the historical background that has brought us to our present day civilization. Most important of all, his historical facts are nearer to being accurate than those of most other ponderous historical volumes. He has unquestionably demonstrated how the study of a subject, considered as dry as history has been in the past, can be made vital and enjoyable.

Medicoliterary Notes.

Paul Claudel, author of the mediæval miracle play, *The Tidings Brought to Mary,* recently presented in New York by the Theatre Guild, is not only a dramatist, but a poet, a mystic, and a statesman. He has held some of the most important posts in the French consular service, among them those of Vice-Consul in New York and in Boston, Consul at Shanghai, China, at Frankfort and at Hamburg; he has been Minister to Brazil and to Denmark, and is now French Ambassador to Japan.

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Dr. E. H. Lewinski-Corwin is the writer of two interesting articles about New York medical matters that have appeared in recent periodicals. "The Academy of Medicine's Contribution to Public Health in New York City" is the title of one in the *Nation's Health* for December, 1922; and "New York as a Hospital Centre," in the *Modern Hospital.*

* * *

A Sick World is the title of an interesting and sane article in the *New Republic* for January 24th, written by John Dewey. Couéism is defined as "an appeal and a method as old as the caveman but dressed up in the latest fashions of the day." He warns against the danger of such socalled cures, especially of the kind of mental processes which make them possible. He writes: "When one compares the benefits of the relief that some sufferers will obtain at Coué's hands and voice, with the harm done by increased dependence upon blind clamor and undiscriminating rumor, by habits of increased unintelligent response to stimuli that owe their force simply to their sensory and emotional accumulation, when one thinks of the growth of credulity and the abandonment of judgment, the balance on the side of benefits is not impressive."

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Public Health Reports for December 22, 1922, contain the full regulations governing the care of lepers, approved by the Treasury Department on December 4th. United States Marine Hospital No. 66 is now the new National Home for Lepers.

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The antivivisectionists are attempting to put through a Congressional bill prohibiting the employment of noxious gases on living animals in experiments by the United States Army and Navy.

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The New York *Medical Week* has established a registry of interns with a view to try to supply the lack of interns in many of the hospitals of the city and as an assistance to the medical profession in general.

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Dr. Charles L. Dana is the donor of a valuable collection of portraits and autograph letters of prominent physicians to the Section of Historical Medicine of the New York Academy of Medicine.

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Pietro Aretino, whose name has been handed down since the sixteenth century as that of one of the monsters of history, has been made the object of special study by Edward Hutton, who is the author of a life of the famous criminal soon to be published by Houghton Mifflin. The writer contends that Aretino was a genius gone astray.

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The Federated American Engineering Societies' Committee on Elimination of Waste in Industry has published its full report, Waste in Industry, a document of more than four hundred pages.

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Dr. John W. Robertson is the author of a book recently published by G. P. Putnam's Sons entitled *Edgar A. Poe; a Psychopathic Study.*

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It is an interesting coincidence that Pasteur, who did so much to extend the work of protective inoculation, was born just a month before the death of Edward Jenner, the discoverer of vaccination. Jenner, like Pasteur, did not limit himself to one line of scientific work. He was a naturalist of renown, a good musician, and a writer of prose and verse.

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Under the terms of a bill introduced in the lower house of the Legislature, mentality equivalent to that of a child of twelve must be a requisite to marriage in Oregon. The bill requires all applicants for marriage licenses to submit to physical and psychological examinations, rules and regulations for which are to be formulated by the State Board of Health. Failure to pass the required examinations would preclude the issuance of a marriage license unless one or both parties submit to sterilization.

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New Publications Received.

THE FORCING HOUSE. By ISRAEL ZANGWILL. New York: The Macmillan Co., 1923.

STAR OF EARTH. By MORRIS DALLETT. New York: Alfred A. Knopf, 1923.

GREEK BIOLOGY AND MEDICINE. By HENRY OSRORN TAYLOR. Boston: Marshall Jones Co., 1922.

THE SUCCESSFUL PHYSICIAN. By V. C. THOMAS, M.D. Philadelphia: W. B. Saunders Co., 1923.

PICTURE FRAMES. By THYRA SAMTER WINSLOW. New York: Alfred A. Knopf, 1923. 324 Pp.

THE PHYSIOLOGY OF REPRODUCTION. By F. H. A. MARSHALL, D.Sc. Second Edition. London, England, 1922.

YOUR INNER SELF. By LOUIS E. BISCH, A.B., M.D., Ph.D. Long Island City: Doubleday Page & Co., 1922.

THE LONG JOURNEY. By JOHANNES V. JENSEN. Translated by A. G. Chater. New York: Alfred A. Knopf, 1923.

GETTING READY TO BE A MOTHER. By CAROLYN CONANT VAN BLARCOM. New York: The MacMillan Co., 1922.

EDGAR A. POE. A PSYCHOPATHIC STUDY. By JOHN W. ROBERTSON, M.D. New York: G. P. Putnam's Sons, 1923.

DISEASES OF CHILDREN. By BERNARD MYERS, C.M.G., M.D., M.R.C.P. Philadelphia: P. Blakiston's Son & Co., 1923.

ENLARGEMENT OF THE PROSTATE. By JOHN B. DEAVER (assisted by LEON HERMAN). Philadelphia: P. Blakiston's Sons & Co., 1923.

Practical Therapeutics

BACTERIOLOGICAL BEEF PEPTONE AS A THERAPEUTIC AGENT IN PEDIATRICS*

By F. Raoul Mason, M. D.,
New York,

Associate in Pediatrics, New York Post-Graduate Hospital and Medical School; Assistant Attending Physician, Babies' Ward, New York Post-Graduate Hospital, etc.

The substance we are dealing with in this paper is not a simple chemical compound, as its name might indicate, but a mixture of proteoses, peptones, polypeptids and aminoacids resulting from the digestion of beef by pepsin or pancreatin. It is a product used extensively in bacteriology under the name of beef peptone for the preparation of culture media.

In the past beef peptone was advocated as a food for invalids, with the belief that in this form proteins would be more easily digested. This theory has apparently not been substantiated and is gradually falling into disuse. It is perhaps worth noting also that many of the pepsin preparations on the market, by the time they are administered to the patient, contain very little active ferments and really consist simply of peptones. In this paper I shall attempt to explain the use of beef peptone for an entirely different purpose, and in order to get a better understanding will briefly review the recent literature dealing with this subject.

During the past few years beef peptone has been employed extensively in Europe, 1, as an antianaphylactic agent (if such a term may be used) and, 2, as a nonspecific protein. Nonspecific protein therapy is not a new therapeutic discovery, in fact, milk was used intravenously quite extensively in the seventeenth century in England in the treatment of a variety of pathological conditions. As far as we can judge, at the present time, satisfactory results were obtained, but this procedure had to be abandoned because of the frequency of emboli. Lately, nonspecific protein therapy has again been brought forward and while it is not a panacea for all ills, has proved useful in certain chronic infections, skin conditions, arthritis, anemias and even acute infections. The mechanism is still very obscure and we would be deviating from our subject by going into details.

Beef peptone has been used to cause a nonspecific reaction by several clinicians, in particular by Nolf, who believes this substance to be superior to proteins because of the immunity of any severe anaphylactic shock following its administration.

Beef peptone as an antianaphylactic agent was first discovered, accidentally I believe, at the Pasteur Institute in Paris. It was found that the preliminary injection of peptone into a guineapig or a rabbit protected the animal from a lethal dose of a protein to which they were sensitized. It seemed, therefore, that the administration of beef peptone prevented the appearance of anaphylactic phenomena. It is only fair to say that constant results are not always obtained when other species of animals are used, but, on the strength of these and similar investigations, several French clinicians attempted to employ beef peptone to ward off certain obvious forms of alimentary anaphylaxis and the results they obtained in many cases were very satisfactory.

The experiments of Pagniez and Vallery Radot probably explain better than anything else the mechanism brought into play. They described a number of cases of alimentary anaphylaxis showing an intolerance to eggs, milk, shellfish, etc., giving rise to such anaphylactic manifestations as migraine, angioneurotic edema, and urticaria, and were able to prevent the occurrence of these disturbances by giving, one hour before the ingestion of these foods, a minute quantity of the harmful substance (just as we temporarily desensitize patients to horse serum by giving them a few drops of diphtheria antitoxins an hour or more before the administration of the full dose). By substituting 0.5 gram of beef peptone to these various substances, one hour before the meal, they obtained similar results. They concluded, therefore, that, as far as temporary desensitizing was concerned, beef peptone was polyvalent for most of the foods causing anaphylaxis. Similar results have been reported by other authorities, and while this method is not uniformly successful, on the whole it has given satisfaction to those who have used it.

In Italy, Solverini also tried beef peptone as an antianaphylactic measure in children sensitized to horse serum following the administration of diphtheria antitoxin. He was able to prevent the appearance of any anaphylactic manifestations in twenty-six children, giving positive skin reactions by injecting them, a day or so before they were tested again, a five per cent. solution of beef peptone (ten to fifteen centigrams to the kilogram of body weight).

Auld, in Great Britain, has employed this substance quite extensively by hypodermic injections in the treatment of bronchial asthma. He divided his cases into two groups, one in which the patient responded to these injections, more or less permanently, and the other in which the patients were not in the least benefited by them.

My own experience with this substance goes back a little over two years, during which time I have tried it out, both by oral and by hypodermic administration in about two hundred cases of asthma in children, in a certain number of other forms of anaphylaxis, and finally in cases in which there were apparently no anaphylactic bases. I am using, after trying out various combinations, at the suggestion of the druggist of the Post-Graduate Hospital, a solution of beef peptone in glycerine and water. This makes a clear solution which can be filtered and sterilized in an autoclave or by boiling in a test tube. In subcutaneous hypodermic injections I have tried it out in psoriasis, eczema, chronic urticaria and bronchial asthma. By mouth, I have given it in a variety of gastrointestinal conditions, asthma, urticaria, psoriasis, eczema, and various skin disorders. Briefly, I will review my experience in these various disorders.

PSORIASIS.

By mouth, one hour before meals, beef peptone has been of very little value. By hypodermic injections (thirty-three per cent. beef peptone, twice a week) in the few cases I have tried it has been very satisfactory. In view of the well known tendency of this disease to clear up of itself very suddenly, I do not feel justified in making too definite a statement. However, it has seemed to me to be more than a coincidence that after such injections (and only after a local reaction had occurred at the site of the injection) the patches of psoriasis would lose their fiery red color, become brownish, peel off and fade more or less rapidly, while new lesions which had been appearing daily, ceased to come out.

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*From the Pediatric Department, New York Post-Graduate Medical School and Hospital.

ECZEMA.

It is well to remember, that in nearly every case of eczema, there is a superimposed infection, and unless this is treated, the removal of the primary factor alone will not cause this condition to disappear. However, in those cases of eczema of anaphylactic origin, a teaspoonful of a ten per cent. solution of beef peptone one hour before meals has often caused the disappearance of an eruption previously rebellious to the usual methods of treatment.

URTICARIA.

In the acute cases beef peptone is obviously of little value as the patient will not, as a rule, take the trouble to follow up the treatment. In the chronic type, however, a small quantity of beef peptone by mouth one hour before meals will, in about one third of the cases, cause the eruption to disappear quite rapidly. Hypodermically, the effects do not seem to warrant its use.

BRONCHIAL ASTHMA.

Peptone by mouth does not improve the real asthmatic symptoms, though it will often cause an improvement in appetite and a gain in weight. In a certain number of selected cases the injection of from one to three minims of a thirty-three per cent. beef peptone will result sometimes in spectacular results, while more often it will cause a decrease in the symptoms particularly the constant cough so often noticed in asthmatic children. Asthma due to emanations, however, if these emanations are not removed, will not be benefited in the least by this method of treatment. The best results are obtained in patients who do not give any positive skin reactions to the various foods or emanations, or those in which no improvement is noticed after the removal or desensitization to the offending proteins. A certain number of such patients are improved by vaccines alone. It is among this group that the best results are obtained with beef peptone, in fact, I believe that some of the results obtained with vaccines are perhaps due to the fact that they contain a certain amount of peptone. However, in certain cases the patients will not improve under beef peptone and will do well with an autogenous vaccine, while some are rebellious to autogenous vaccines and clear up under beef peptone. I am quite convinced, however, that if no improvement is noticed after the second or third injection, it is useless to keep up this method of treatment. Beef peptone injections are not indicated in all cases of asthma, they are only advisable when the common methods of controlling this disease have failed.

HAY FEVER.

The results do not warrant its use in this condition.

GASTROINTESTINAL UPSETS.

In a certain number of recurrent cases of vomiting, diarrhea, nausea, cramps after meals, and also in malnutrition and lack of appetite, symptoms so common in childhood, beef peptone by mouth, one hour before meals, will often result in rapid improvement. Not all these cases give a clear anaphylactic history and it is hard to say beforehand in exactly what cases it should be employed.

NONSPECIFIC PROTEIN THERAPY.

While I have not used it extensively in this respect, occasionally it gives good results, probably as well as any other protein.

A few examples from private practice and hospital will perhaps make this a little clearer:

Case I—C. W., aged ten, female, of German descent. For two years the patient had been suffering from psoriasis, which was particularly extensive on arms and legs. The scalp was full of large scales which were forming continually. She had been to various skin clinics and systemic and local treatment (arsenic, etc.) had been tried with no improvement. She was given injections of a thirty-three per cent. beef peptone solution once a week, increasing one drop each time. After the second injection it was found that new patches failed to appear, and following the third a distinct change for the better was noticed. No local treatment of any kind was given. The dose was increased to five minims, but as it caused a rather severe reaction was reduced. At this time the scalp began to clear up, and soon was free from scales for the first time in two years. After the sixth injection treatment was discontinued, as the patches were rapidly fading away. For several months after this improvement continued so that only a few very small stubborn areas were left. At this time, however, several new small patches were noticed and two minims of a thirty-three per cent. beef peptone were then administered twice a week. This rapidly caused all the skin lesions to disappear entirely, and the child has been well ever since. It is of particular interest that the scalp is particularly clean and that there is now not even the slightest dandruff.

Case II—P. R., boy, aged ten, of Jewish parentage. He had suffered from bronchial asthma for several years, with constant cough and attacks several times a week. Skin reactions were negative and the usual methods of treatment, including autogenous vaccine, failed. Positive D'Espigne sign to third dorsal and the x ray revealed a mediastinal adenopathy. He was sent to the country for several months, with marked improvement. On his return, however, the symptoms recurred as severe as ever. He was given beef peptone injections once a week, going from one to four minims. Under this treatment the cough practically disappeared, the boy gained in weight and for the last four months has had only one mild attack of asthma.

Case III—A. S., aged eighteen months, male, of Italian parentage. He had had chronic urticaria since eight months of age. Was given half a teaspoonful of a one tenth per cent. beef peptone solution one hour before meals. Within one week the urticaria had practically disappeared.

CASE IV—J. S., aged two and an half, male, of Jewish parentage. He had always been a difficult feeding case and could not tolerate cow's milk, and as he had reacted to lactalbumen, was brought up on dryco. Never in his life had he had a real hard stool. In spite of the strictest diet, he had had recurrent attacks of diarrhea, which would last for a week or more and would cause considerable loss of weight. Finally beef peptone was given to him in a ten per cent. solution, one hour before meals. This prevented any recurrence of the diarrhea for several months, but the stools never became hard. The mother went away for the summer and the peptone was discontinued. Two weeks later diarrhea recurred and was checked by a special diet and beef peptone. In the fall, peptone again being discontinued, another attack of diarrhea developed. The child was then tested and gave a positive reaction to lactalbumen and several foods. Calcium caseinate (casec) and water for twenty-four hours was prescribed, which checked the diarrhea. A fairly liberal diet was given and previous to each meal twenty drops of a twenty per cent. beef peptone and five drops of raw cow's milk administered. For the first time in its life the baby had a solid stool, and since then has been thriving. In this case apparently beef peptone alone did not desensitize completely, as evidenced by the presence of somewhat loose stools.

CASE V—J. A., male, seven years old, of Jewish parentage. He was undernourished and complained of abdominal pains, mostly after meals. The diagnosis of chronic inflammation of the appendix (as is often the case) had been made. Several examinations, including a rectal, failed to show any real appendiceal tenderness or rigidity. Laxatives failed to improve the condition. He was given one teaspoonful of a ten per cent. beef peptone solution one hour before meals. This caused the pains to disappear. Several months afterwards the boy came back. He had been doing well until the medicine was stopped, and even for a little while after, but lately the symptoms had recurred.

In order at least to obtain an inkling of what was taking place, I carried out several experiments. The only finding of any interest is that an abnormally large number of anaphylactic children—I would say over fifty per cent.—gave a positive skin reaction to beef peptone (regardless of the fact that it has been given to them or not), while normal children rarely do. For instance, I tested, with the permission of Dr. LaFetra, twenty-five children on his service last winter in the baby wards of the Post-Graduate Hospital, and of these only two gave a faint positive reaction. I was unable to see the parents of these children to obtain any definite anaphylactic history. It seems to me that it is because the protein tested is in this partly broken down stage that this occurs, for egg peptone, tested side by side, though not always giving identical findings, did so quite often. These are the only two peptones which I have been able to obtain so far, but it is at least suggestive.

One other possible explanation of the action of beef peptone is to be found in the recent papers of Widal and his coworkers. He states that normally the portal vein from the intestines contains proteins, and partly broken down proteins as well as aminoacids. One of the functions of the liver, he believes, is to change these partly digested substances into aminoacids, so that they enter the blood stream as harmless compounds (aminoacids will not cause anaphylactic reactions). In pathological liver conditions Widal has shown that during the early part of digestion this proteolytic function of the liver lags behind and that compounds more complex than aminoacids actually enter the systemic circulation. This causes a protein reaction of what Widal calls a hemoclasic crisis, that is, a physiochemical change in the composition of the blood stream. Upon the fact that the individual is sensitized or not to this particular protein will depend the severity of the resulting symptoms. Apparently the administration of a small quantity of beef peptone, one hour before meals, will start the proteolytic function of the liver, so that by the time the unbroken proteins of digestion are taken up by the portal vein they are easily taken care of.

Whether these theories are proved to be correct or not, it is certain that in a certain number of cases results are obtained by its use. It is a simple therapeutic measure, the preparation is easy to make, keeps well if a small quantity of alcohol is added to it, and can quickly be sterilized if it is desirable to give it subcutaneously. As a safe measure, however, whenever it is to be given hypodermically, I believe that no more than one minim should be given the first time and the patient watched for about ten minutes afterwards.

CONCLUSIONS.

Beef peptone, mixed with glycerine in water (always mix with the glycerine first), can be given by mouth or hypodermically for the following purposes.

1. As an antianaphylactic agent, either by mouth one hour before meals, or by hypodermic.
2. To start the various functions of digestion of the proteins (particularly that of the liver) and thus facilitate their assimilation, by oral administration before meals.
3. As a nonspecific protein, by hypodermic injections.

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(Concluded from page 606, Vol. CXVI)

The Significance of Clinical, Radiographic, and Chemical Changes in the Early Diagnosis of Rickets.—Dr. Alfred F. Hess, of New York, asserted that rickets was essentially a systemic disease and it had become very difficult to say whether it was present or not. For the past four or five years he had had an opportunity to follow a number of infants month by month and to note the signs of rickets as they developed on different diets. They had found the clinical signs of rickets very variable. For instance, the development of the teeth was not to be relied upon, since in some children with rickets they developed early, in others late. The question of when the child began to sit or stand, the question of musculature, and of craniotabes were all unreliable as signs of rickets. Beading of the ribs was the best clinical sign of rickets. It was, however, a poor sign as regards the cure of rickets, since it persisted in spite of the use of codliver oil and the ultraviolet rays. They had found that in the winter it took three and a half months to cure rickets by means of codliver oil, while in the summer, when they had the additional factor of light, it took only two and a half months to effect the same result. In an infant over a year old beading of the ribs had little value as a sign of the development of rickets, for when the Harrison groove appeared the beading disappeared.

Dr. Hess expressed disappointment in the x ray. He had found that the change in the epiphyses was a late sign of rickets, the beading of the ribs being noticed much earlier. The condition of the developmental centres and the calcification of the shaft of the bone were also unreliable signs. On the other hand, in regard to cure the situation was quite different. When one gave light therapy or codliver oil, within two weeks or certainly within a month, there was marked calcification of the epiphyses so that the röntgen ray was the most reliable test by which to determine whether a therapeutic method was efficacious.

The normal inorganic phosphate, according to the method of Doig and Bell, varied from four to four and a half mg. and amounts below 3.75 were considered as indicating the presence of rickets. He had found that this change in the phosphate content of the blood came about considerably earlier than changes that could be detected by the röntgen rays, and sometimes sooner than beading. He had found that when whole milk was given the beading came earlier than the lowering of the phosphate. Whether a low inorganic phosphate content was to be judged a pathognomonic sign of rickets was difficult to say at the present time. It had been noted that in the winter months the inorganic phosphate content decreased and in the summer it rose. This socalled seasonal tide in the phosphate content seemed not entirely associated with rickets. The phosphate content rose very rapidly as the rickets improved.

As to the treatment, in addition to codliver oil and the ultraviolet light, the carbon arc light had been found very efficacious in the treatment of rickets. The carbon arc light could be used immediately for one hour, whereas the ultraviolet light could be employed for only a few minutes at first.

Factors Concerned in the Calcification of Bone.—Dr. John Howland and Dr. Benjamin Kramer presented this communication, which pointed out that calcification consisted essentially in the deposit of calcium phosphate in the cartilage and bone. To bring about this deposition a certain minimal concentration of calcium and inorganic phosphorus must be present in the serum. The concentration of these substances in the serum of rachitic children has been determined. Evidence of calcification has been obtained by radiographic and anatomical studies. By comparing the information gained in these different ways it is possible to say that failure of calcification may result from a diminution of calcium or of phosphorus or both of these in the serum and to state approximately the limit of concentration below which calcification does not occur.

An Unusual Case of Mediastinal Tumor.—Dr. Thomas B. Cooley, of Detroit, recorded this case, which occurred in a boy, seven years of age, who was admitted to the Children's Hospital on February 2, 1922, with a history of having had a sudden attack of severe dyspnea the night before. The family history was negative. The hospital records showed that the boy had been in the hospital for a few days in 1919, with a diagnosis of bronchitis. Nothing was noted at that time except that the breathing was labored. Physical examination showed that the left upper chest seemed fuller than the right and there was a plexus of enlarged and superficial veins in this region. A node the size of a pea was found in each axilla. Percussion of the chest revealed an area of pronounced dullness extending from just outside the left nipple line nearly to that on the right, with fairly straight borders, and reaching from the level of the clavicles to the diaphragm line. The greatest transverse diameter was twelve mm. On auscultation the breath sounds were greatly diminished. X ray examination of the chest showed an area of pronounced density corresponding closely to that outlined by percussion. The mass seemed to fill more than half the thorax. A provisional diagnosis of Hodgkin's disease, thymus gland disease, or lymphosarcoma was made. One of the axillary nodes removed later showed nothing characteristic histologically.

Owing to two attacks of dyspnea, one of which was nearly fatal, it was decided to resort to intensive x ray treatment without further delay. The dosage employed was ninety kw., five ma., seven minutes, at eight inches skin target distance, with a four mm. aluminum screen. After the whole area had been covered from the front the back was given a single exposure. There were no more attacks of asphyxia after the first treatment. After three treatments a radiograph showed the area of density to be about five cm. narrower, and distinctly less dense, than before the application of the rays. The findings by percussion agreed with this. When last seen on April 21st, the boy had gained seven pounds, had rosy cheeks, and abundant energy, and his white blood count which had been 11,000 to 13,000 had fallen to 8,000. The distended veins over the left chest had disappeared during his stay in the hospital, and the two sides of his chest were not equal. The röntgenographic findings were now practically normal. In the writer's opinion this was Hodgkin's disease or lymphosarcoma. He could not, however, definitely exclude a very large thymus hyperplastic gland, though if this had been present the conspicuous venous plexus should have been observed during his previous stay in the hospital, even if dullness were missed. Again, the thymus may have been sarcomatous.

Prognosis and Treatment of Tuberculosis in Infancy and Childhood.—Dr. ROWLAND GODFREY FREEMAN, of New York, stated that it was characteristic of tuberculosis in early life that it might cause considerable polynuclear with little leucocytosis or increased polynuclear count. There was very little emaciation and the lesion was more likely to be in the lower lobes of the lung than in the apices. The results obtained in the cases reported, Dr. Freeman believed, were due to the following curative agent, presented in the order of their comparative value:

1. Fresh out of door moving air, cold if possible. The value of this agent was generally conceded but too few cases were kept in this sort of air twenty-four hours each day.
2. Heliotherapy. This was a valuable agent in tuberculosis of the lungs in children in this country. In a limited experience Dr. Freeman had seen no bad results from its use. In visiting Rollier's sanitarium at Leysin, Switzerland, last summer, Dr. Freeman learned that they considered it a rather dangerous agent in lung tuberculosis. They used it but thought it should be employed with caution.
3. Codliver oil. This was a useful agent if it was well tolerated, as was usually the case.
4. A full diet was essential and complete rest was necessary for a long period.

Tuberculosis in infancy, which was localized, might be cured by prompt interference. If, however, it had involved the lungs, it rapidly became a generalized tuberculosis and gave an absolutely bad prognosis. Tuberculosis in either infancy or early childhood, whether rapidly progressive or slow in its progress, caused comparatively little emaciation. If an infant or young child with a chronic lung condition emaciated rapidly, the probability was the condition was not tuberculosis.

The Dose of Diphtheria Antitoxin: An Analysis of the Records of the South Department.—Dr. EDWIN H. PLACE, of Boston, declared that the effective dose of antitoxin must be determined chiefly by the results actually obtained in practice rather than by *a priori* facts from animal experiment. The striking influence of antitoxin on the mortality from diphtheria was so evident from statistics throughout the world as not to require citing here. In the South Department of the Boston City Hospital, the drop from an average of about forty per cent. to about fifteen per cent. in 1895 occurred with a dose of about 1,500 to 2,000 units. It thus was evident that doses now considered relatively small would effectively control a large percentage of cases and it soon became evident that late in the disease no dose was effective. It was possible that between these two groups there might be cases, probably few, in which the damage had not been unalterable, though small doses would not have saved them; larger doses were used and a slow decline in the mortality curve was noted. It was to inquire whether this was due to earlier treatment, milder cases, or difference in age of patients, or to difference in size of doses, that groups of cases were studied at different times. In the first group, 1895-1896, the dose of antitoxin was customarily from 1,500 to 2,000. In this group the mortality was 8.8 per cent. In the second series, 1900-1901, the usual dose was 2,000 to 4,000 units, occasionally 8,000 at intervals of four, twenty-four, and seventy-two hours, or even several days, until clinical improvement. Doses as large as 110,000 units were occasionally given subcutaneously. Only thirty-five per cent. received a single dose. In the third series, the doses were much larger, varying from 4,000 to 100,000, averaging about 30,000 units, of which ninety-two per cent. received only one dose; sixty-two per cent. were treated intravenously.

Whether increased dose or intravenous route played the more important part it was impossible to say, as no group of small intravenous doses was available in this clinic. In nearly all the severe cases for the past five years intravenous injections had been given, but no fall in the mortality curve had occurred; in fact, the mortality had increased somewhat so that other factors, it seemed, were more important. In the wards the estimate of the amount of antitoxin to be administered was made on the severity, the extent and especially the rapidity of development of the local inflammation. The general scheme of doses had been: Mild cases, 2,000 to 5,000; moderate, 10,000 to 30,000; severe, 30,000 to 100,000. No appreciable harm had been observed from these larger doses. These statistics again demonstrated that the time of treatment superseded all other factors in the mortality. This fact reiterated again and again, was not acted upon in actual practice as often as it should be. It was not a bad dictum that any inflammation of the mucous membrane should be treated as diphtheria unless proved clinically otherwise. In such a plan antitoxin should be given at once, unless the physician was sure that no harm could result from diphtheria with delay. The fear of anaphylaxis was much greater than fact justified and the fear of diphtheria poisoning was tremendously less. The figures presented in this paper showed: 1, that doses of 2,000 to 5,000 units were inadequate in diphtheria treatment, even if repeated at intervals; 2, that intravenous antitoxin in doses averaging 30,000 might save lives that would be lost with less adequate treatment; 3, that no doses of antitoxin were likely to reduce the mortality of diphtheria as a whole unless the delay in administration could be eliminated.

The Size of the Sella Turcica in Relation to Body Measurements.—Dr. Lawrence T. Royster and Nathaniel F. Rodman, of Norfolk, Va., presented this study, based on the tabulated records of four hundred children divided into groups as follows: Under two years of age; from two to five years; from five to nine years; from nine to sixteen years. There were fifty males and fifty females in each group. From the data collected it seemed fair to draw the following deductions: 1. A base of comparison of measurements had been established. 2. The torsa was of much greater length than the lower extremities in young children and the point of half the height gradually reached the upper border of the symphysis much earlier than had been suposed. 3. The fat pads in the upper pelvic girdle and over the sacral triangle were normal in infants and young children and were present in the majority of cases during older childhood, but began to disappear about the seventh year. They were to be considered as suggestive of dyspituitary dysfunction only when pronounced. 4. From infancy to the fifteenth years the average measurements of the sella turcica showed steady increase in size, amounting approximately to fifty per cent., but the interclinoid space did not increase in proportion to the other measurements of the sella, but on the other hand remained practically constant. 5. There was no definite relation between the size of the sella and the interclinoid space as measured on the flat plate and normal overweight or underweight children. 7. There was no definite relation between the size of the sella or interclinoid space as measured on the flat plate and the point of half the height or the height to span ration. 8. The relation of span to height remained practically constant throughout childhood. 9. The size of the sella as measured on the flat plate was probably a very inaccurate guide to the function of the pituitary. 10. In taking a radiograph of the sella distortions and shadows might occur which caused erroneous interpretation, due to the angle of either plane of the skull in relation to the target. These divergences might cause accentuation of the optic foramen, suggesting diverticula and the shadow of the outer angle of the lesser wing of the sphenoid might cause a distorted shadow of the interior clinoid process.

A Study of the Shadows in the Thorax of the Newly Born.—Dr. L. R. DeBuys and Dr. E. C. Samuels, of New Orleans, presented this study of fifty-two newborn infants, and included careful physical examinations and accurate measurements of all the cases examined which were consecutive and were not selected. Every baby was radiographed within the first forty-eight hours after birth, with the exception of a premature infant which was not radiographed until it weighed three pounds fourteen ounces. In none of these cases was there a heart murmur and in none was there any clinical evidence of enlarged thymus. In no instance was there the slightest evidence of inconvenience to the patient nor of interference in his normal progress following the making of the radiograph. The types of hearts as determined by the shadows were as follows: Globular, twenty-one; adult type, seven; drop heart, five; nutmeg, three; square, two; round, one; unusual, one; unclassified, ten.

The study was summarized as follows: 1. Heart shadows vary in shape, size, and position. 2. These variations occur with no relation to the size of the infant. 3. The heart shadows may be grouped in several types according to shape. 4. The variations in size and position occur in each of these types. 5. There is no constant relation between the heart shadow and the shadow of the thymus. 6. The shadow of the thymus is not necessarily influenced by the position of the heart. 7. The shadow of the thymus varies in its size and position independent of the heart shadow and with no relation to the size of the infant. 8. The variations in the shadows of the heart and of the thymus can exist without clinical manifestations of disease.

Cerebrocerebellar Diplegia—Atonic Type.—Dr. T. C. Hemplemann, of St. Louis, reported two cases of this condition, one with complete autopsy findings. The most striking thing about the brain in this case was the distinct asymmetry between the two cerebral hemispheres and the two lobes of the cerebellum which corresponded to a similar asymmetry of the cranial bones. The left half of the cerebellum was much thinner and smaller than the right, and the bloodvessels on the left side were considerably smaller than those of the opposite side. Sections were taken from the cortex at five levels, as well as from areas deeper in the cerebral substance, including the lateral ventricles and choroid, and also through the internal capsule, medulla, and right and left lobes of the cerebellum. In none of these sections were degenerative changes or sclerosis found. The same was true of sections of the cord taken at four levels. The asymmetry then was due to developmental defect.

The Nitrogen Metabolism in Some Conditions of Constitutional Diathesis.—Dr. Frederic W. Schultz, of Minneapolis, recalled that at a previous meeting of the society he had attempted to establish a series of normals for nonprotein nitrogen in blood of infants and older children. This work had been followed up by an extensive investigation of a large series of cases showing various pathological manifestations and conditions. The results showed that the nonprotein metabolism in all these conditions remained normal or nearly so, except in those cases which showed marked involvement of kidney function or were accompanied by marked febrile manifestations.

The method of blood analysis used was that of Folin and Wu. Blood sugar determinations were also made on all the material. A part of the material studied concerns a series of cases in which the organism showed some pronounced manifestation or phase of constitutional diathesis. As regards their metabolism, these individuals sometimes reacted somewhat differently from the normal. There were in all 112 cases, of which thirty-nine showed severe asthma, thirty-five were of the neuroarthritic type, seventeen had repeated attacks of cyclic vomiting. The remaining four cases showed pronounced evidence of spasmophilia. An effort was made to select only extreme types, so that there would be no doubt as to the presence of the condition, and any effect it might have on tissue metabolism. The results showed a higher output of the total nonprotein nitrogen in the asthma and exudative diathesis cases.

Abstracts from Current Literature

PEDIATRICS

Use of Lactic Acid Milk (Whole Buttermilk) in Infant Feeding Over Long Periods.—Borden S. Veeder (*Medical Clinics of North America,* July, 1922) has maintained a series of twenty-five to thirty cases of socalled difficult feeding on acid milk continuously for four to eight or even ten months. Nearly all children will take it and none tire of it. It produces not only a remarkable and steady gain in weight but also a splendid physical development. In addition to the lactic acid milk, codliver oil and fresh fruit juices are also given daily. Between the fifth and sixth months farina or cream of wheat is added and four to six weeks later a green vegetable. Culturally soured milks are just as good as the home made sour milk. A quart of fresh milk is boiled hard for several minutes and cooled rapidly, poured into a boiled glass jar, and the culture from a laboratory is added. The milk is allowed to stand at room temperature for several hours and then beaten up. On the next day three to four ounces of the milk of the previous day is added in place of the culture. Corn syrup or dextromaltose is used as the carbohydrate. The indications for the use of this milk are: 1. A baby over two months of age, who has been off the breast for two or more weeks, but who is not only three to four pounds under average weight for its age, but markedly undernourished and marantic. 2. A baby doing well on the breast or a complemental feeding, but which will not adjust in three weeks to a sweet milk mixture after breast feeding has been stopped. The acid milk mixture should be used more frequently in such cases than it has in the past.

Infantile Acute Endocarditis.—E. F. Skinner (*Lancet,* June 10, 1922) reports a very rare case of acute endocarditis in an infant four months old. An intractable eczema was the only reason for seeking medical attention, as aside from this eczema the child appeared remarkably well. About fourteen hours after admission to the hospital, the child was found dead in bed, but the cause of the death was not ascertainable. The necropsy showed nothing abnormal except the lungs and heart. The lungs showed subpleural hemorrhages. The heart appeared normal, but the tricuspid valve was less smooth than normal and the mitral valve was gravely involved, the free edges and the auricular surfaces of the flaps being covered with soft vegetations, not large, quite recent and extremely friable; there were no congenital defects and the coronary arteries were patent. There were no clinical signs of cerebral or pulmonary disturbances and no pathological features. The cause of death was probably the onset of ventricular fibrilliation following an embolus in a coronary artery sufficiently small to have passed beyond the openings without giving any signs apparent to the naked eye. The author believes this case to be a very rare form of the required disease and not fetal in character for the following reasons: 1, there was no history of rheumatism in the mother or any disease transmissible through the placenta; 2, the left side of the heart was affected more than the right; and, 3, there were no congenital cardiac defects.

Studies in Butter Flour Nutrition.—H. Ernberg (*Acta Paedriatica,* December 16, 1922) used butter flour diet as prepared by Czerny and Kleinschmidt in doses not exceeding two hundred grams to the kilo of body weight in 375 cases. The result was satisfying, particularly in the cases of debilitated and undernourished infants in the very first months of life. Good results have also been obtained in numerous instances in the treatment of older infants. Its use is contraindicated in cases of diarrhea, grave chronic nutritional disorders, or in cases with a marked tendency to diarrheal and weight reducing reactions to parenteral infections. It does not seem to have any particular advantage in the treatment of rachitis. This diet should only be followed under the direction of a physician.

Edema in Childhood.—H. C. Cameron (*Clinical Journal,* July 5, 1922) says that angioneurotic edema is probably more common in childhood than at any other period. There is a marked family predisposition, and the disease seems to be especially common among Jews. Children who suffer in this way are usually quick, excitable, of a highly nervous temperament, and an attack may be occasioned by an emotional outbreak. The edema usually occurs in circumscribed patches, common situations are the eyelids, lips, hands and fingers, though sometimes large joints are affected. Giant urticaria may occur with or between the attacks. More serious are cases in which one or another part of the viscera is involved; a serious exudate into the bowel wall may produce symptoms of intestinal obstruction, into the larynx may cause suffocation. When the attacks are clearly associated with excessive emotional display and extreme nervousness, attention must be paid to the management and the personal influences which surround the child. Calcium bromide or calcium lactate, four or five grains, or liquor trinitrini, one minim, may be tried. If the attacks appear to follow upon the ingestion of any particular food, the suspicion can be confirmed by noting the reaction of the patient's skin to solutions of the suspected protein. The test is carried out as for a Von Pirquet tuberculin test. If the test is positive an attempt may be made to desensitize by graduated injections.

Treatment of Diabetes Mellitus in Childhood.—N. Johannson (*Acta Paedriatica,* December 16, 1922) having used the Joslin starvation treatment for the diabetes mellitus cases in the Crown Princess Lovisa's Hospital for Sick Children in Stockholm, formulates his opinion on the result of the treatment as follows: The system was carried out on fairly rigid lines, thus facilitating the accomplishment of its object, allowing us to get rid of sugar and ketone elements more rapidly than would otherwise be possible, and above all enables us to apply ourselves much more energetically and successfully than was possible with the older methods to the struggle against acidosis. This establishes a tolerance regarding the individual foodstuffs, which appears to be of remarkable and lasting duration. The dietary during the course of the cure quickly becomes extremely varied, in contrast to what was the case in the past with regard to the diabetic diet. The characteristic of the treatment by starvation diet is that it often leads to a very obvious loss of weight, which, however, is not considered dangerous to the general health or to tolerance. On the contrary the latter, as a rule, also stands the strain in the shape of a diet so generous that it permits the loss of weight being repaired and even of the weight being increased. Whether the otherwise grave prognosis in diabetes in childhood can ultimately be influenced to any extent by Joslin's method, is a question which our experience up to the present does not permit to answer. It is, however, not inconceivable that this may prove to be the case. It undoubtedly indicates a certain improvement, since it is attended by a relatively endurable existence for the patient over a considerable period of time, this being the obvious result of the privations she is called upon to endure and in this way her interest in life is increased and her ambition aroused to carry out the doctor's instructions in every particular, a point of view to which a certain value may be accorded, at any rate in the case of older children.

The Red Corpuscles and Their Variations.—E. J. Rud (*Acta Medica Scandinavica,* November 29, 1922) performed a series of experiments with the object of ascertaining the average, maximum, and minimum number of red corpuscles in healthy individuals. He examined sixty-nine adults of all ages and forty-nine children with the following results: In male adults, the average number of red corpuscles was 5,330,000 to the c. c., the maximum 5,900,000, and the minimum 4,370,000. In female adults, the average was 4,850,000 to the c. c., the maximum 5,390,000, and the minimum 4,300,000. Subjects of advanced age showed a slightly lower average than the younger subjects. In the children, the newborn showed the highest average: 5,680,000. Maximum 6,590,000, and minimum 4,470,000. Nursing infants: Average 5,110,000; maximum 5,930,000, and minimum 4,270,000. Infants between one and fourteen years of age: Average 4,960,000; maximum 5,590,000, and minimum 4,580,000. Sex had no appreciable influence on the number of red corpuscles in children.

Experimental Rickets.—E. V. McCollum, Nina Simmonds, J. Ernestine Becker, and P. G. Shipley (*Journal of Biological Chemistry,* August, 1922) in a series of studies found that codliver oil oxidized for twelve to twenty hours does not cure xerophthalmia in rats, but does cause the deposition of calcium in the bones of young rats suffering from rickets. Other fats, such as cocoanut oil, shark liver oil, burbot liver oil, and certain vegetable fats, as cottonseed oil, maize oil, sesame oil, and olive oil, were also studied. The evidence described here demonstrates that the power of certain fats to cause the healing of rickets depends on the presence in them of a substance which is distinct from fat soluble A. The experiments show the presence of a fourth vitamine, whose specific property appears to be the regulation of the metabolism of the bones.

Alfred F. Hess, Lester J. Unger, and Joseph M. Steiner (*Journal of Experimental Medicine,* October, 1922) subjected animals on a rickets producing diet to irradiation with röntgen rays, in all of which, in spite of this treatment, rickets developed. This result was quite contrary to that obtained when the mercury vapor or the carbon arc lamp was used. Rats on a diet containing phosphate in an amount adequate to prevent rickets did not become rachitic when exposed to massive doses of röntgen rays of an intensity sufficient to produce marked destruction of the blood forming cells of the marrow. These authors, working in conjunction with Alwin M. Pappenheimer, were able to protect young rats on a diet low in phosphorus from the development of rickets by irradiations with sunlight for about fifteen minutes daily, though during the winter months this degree of light was insufficient. The rays from a mercury vapor lamp, and also from a carbon arc lamp, were likewise efficient protective agents. Moderate variations in temperature do not alter the efficiency of the light rays.

Bladder Diverticula in Children.—A. Hyman (*Surgery, Gynecology, and Obstetrics,* January, 1923) concludes that vesical diverticula are rare findings in childhood, not more than thirty being found in a review of over six hundred cases. Diagnosis of this condition in children should present no difficulties. Little value can be placed on the history. Physical examination of the abdomen is of considerable importance. A chronically distended bladder, especially asymmetrical in outline, should make one suspicious of a diverticulum. The cystoscope and cystogram are absolutely essential in making a correct diagnosis. Of the two, the cystogram will be found more valuable. No evidences of obstruction, either vesical or urethral, were found in the three cases reported in this article. All three diverticula were in immediate proximity to the ureter; in one, the ureter opened into the sac and as a result, the ureters were compromised to such a degree as to cause obliteration of the lumen, with resultant dilatation. Division of ureter with reimplantation was performed in all three cases, with recovery of patients. Undoubtedly there will be an increase in the number of cases reported as soon as cystoscopy in children becomes more of a routine procedure. The presence of diverticula in patients so young, without evidences of any obstruction, leads one to conclude that they were congenital and that in all probability many of the diverticula in adults have also a similar origin.

Nasal Obstruction in Infants During the First Year of Life.—J. Arnold Jones (*Lancet,* August 12, 1922) enumerates the following causes of nasal obstruction during the first year of life: 1, Congenital occlusion of the nostrils, a, of the anterior nares through a congenital web of skin at the junction of the vestibule with the nasal chamber proper, and b, of the posterior nares, where a diaphragm consisting of bone, or partly of bone and partly of membrane, may partially or totally obstruct one or both choanæ; 2, the temporary presence of mucous secretion in the nose and engorgement of the nasal mucous membrance, during the early days of life before mouth breathing is established; 3, congenital syphilis; 4, mongolism, and 5, adenoids—the most common cause of all. The symptoms are: 1, Inability to suckle efficiently; 2, snoring when asleep and frequent suffocative attacks; 3, persistent cough; 4, nasal discharge; 5, convulsions; 6, otorrhea. The first two symptoms establish the diagnosis. The treatment is elimination of the cause.

Adolescent Rickets.—P. Lewin (*Surgery, Gynecology and Obstetrics*) asserts that it is a very interesting fact that these deformities either make their appearance, or, if present, grow markedly worse, coincident with adolescence. During this period increased demands are made on the organism, and if at that time the general metabolism and especially bone metabolism is disturbed, deformities are prone to occur. It is probable that a combination of bone softening and heavy lifting or carrying causes some cases. Others are due to relaxation of muscles and ligaments, and in this type infections may be a causative factor. Certain definite factors occurring at a certain definite "cycleogical" time. These factors are: 1, the growing period for that individual; 2, athletic overindulgence, as seen in the high school boy; 3, physical overwork, such as carrying heavy loads as in the case of the grocery boy, or the young girl doing domestic work which is too strenuous for her; 4, general food deficiency; 5, particular food deficiency; 6, stimulated endocrine activity; 7, suppressed endocrine activity; 8, disturbed endocrine activity, i. e., abnormal chemical secretions. It is Lewin's belief that the whole question is one of bone metabolism and especially calcium metabolism due to the above mentioned factors, and the immediate cause of deformity is a disproportion between the carrying power of the bones and the load they are forced to carry. He believes that corrective measures should be instituted and that operation is not attended by unusual risk.

Calcium and Phosphorus Metabolism in Childhood.—H. C. Sherman and Edith Hawley (*Journal of Biological Chemistry*, August, 1922) determined the complete balance of intake and output of calcium (and in most cases also of phosphorus) in four progressive series of experiments on twenty-one children between the ages of three and fourteen years. As a result of this investigation the following points are brought out: On an ordinary mixed diet containing daily 750 gm. of milk and furnishing a total of 0.74 to 1.02 gm. of calcium a day, these children stored 0.15 to 0.62 gm. of calcium daily, the amount being approximately proportional to the size of the child, and averaging 0.01 gm. of calcium to the kilo of body weight a day. An increase of the daily milk allowance to 1,000 gm. increased the storage of calcium. The optimum storage of calcium seems to occur when the diet contains a quart of milk a day for each child, and the necessity of maintaining this level of milk intake up to at least the age of twelve to fourteen years is emphasized. Experiments were made in which vegetables replaced about half of the milk in a course of the calcium. The children did not seem to utilize the calcium of the vegetables as efficiently as that of the milk, and the balances were also more variable and less favorable. In general, the conditions influencing the storage of calcium tended to influence that of potassium in the same direction. The requirements of children of three to thirteen years of an intake of a gram of calcium a day to induce optimum storage of this element has an important bearing on standards for calcium in family dietaries. In groups of people where growing children are to be fed perhaps one gram of calcium or more a day for each person should form part of the diet.

A Comparison Between the Medicinal Dietetic Treatment and Light Treatment in Rachitis.—I. Jundell (*Acta Paedriatica*, December 16, 1922) finds that the medicinal dietetic treatment and the light treatment have about the same considerable healing effect on the rachitis. The judgment will be about the same with regard to the clinical picture as well as to the result of the röntgen examinations. The combined medicinal, dietetic and light treatments do not lead to appreciably quicker results than the treatment with one or the other of these methods. The medicinal dietetic treatment is especially indicated, first, in all the numerous cases where the child is manifestly overfed, and, second, when the outward circumstances make the arranging of light treatment impossible, and the child's state of nutrition does not contraindicate a relative inanition for some time. The method of light treatment is specially indicated, first, in those cases where the state of nutrition is such that the child might be injured by a period of relative inanition, and, secondly, in those cases where the child suffers from an illness of a kind or in a stage which makes it desirable to keep the child in a specially good state of nutrition. The light treatment exercises its favorable effect with ordinary and even ample diet. Twenty-one case reports are given in detail.

The Newborn During the War.—Michael David (*Zentralblatt für Gynäkologie*, May 20, 1922) on reviewing the statistics, found that the number of miscarriages and the number of stillbirths did not increase during the war; that the number of male children were not increased; that the mortality of the newborn children was not increased for the first few days of life; that the body measurements of the newborn showed an average decrease during the war, which decrease was still more marked during the last three years of the war, with a more pronounced decrease in the number of males; the greatest decrease was found in the weight (3.0 to 3.75 per cent.), the next in length (2.5 to 3.2 per cent), and the least in the circumference of the head (0.9 per cent.); the decrease in the average measurements was not produced by the shortening of the period of pregnancy to 273 days. Unquestionably, deficient nourishment was the most effective factor.

The Nervous Complex in Infantile Intoxications.—G. Bessau, S. Rosenbaum, and B. Leichtentritt (*Monatsschrift für Kinderheilkunde*, August, 1922) conclude that: 1. The nervous complex of intoxications consists of coma, deep respiration, catalepticlike conditions, convulsions, vomiting, and symptoms of disturbances of the vegetative nervous system (fever and subnormal temperature). 2. The possibility of an abnormal permeability of the epithelium of the corneum cannot be excluded in the presence of a positive result with the Löwi reaction. 3. Disturbances of temperature and the symptoms of the nervous complex are most closely related; the disturbance of temperature is a less characteristic but more delicate symptom, but both phenomena are probably the expression of a central disorder. 4. Starvation does not cause a recession of the nervous complex. 5. The administration of food, *per se*, seems to be harmless and only in an indirect way can it act injuriously through the production of diarrhea or vomiting, which, in turn, are the causes of an exsiccation of the organism. 6. The increased permeability of the gastrointestinal canal is not an absolutely necessary prerequisite for the development of the nervous complex and the increased permeability certainly does not in itself lead to the appearance of the nervous complex. 7. With a material of alimentary intoxication, it is impossible to decide definitely whether or not the infection of the upper segments of the intestine with colon bacilli is a prerequisite for the occurrence of the nervous complex; to decide this, it is necessary to include numerous experiments with infections which show the symptoms of alimentary intoxication. 8. In every case in which the nervous complex occurs there are usually signs of extreme desiccation and an oliguria or anuric condition. 9. The anuria is not the result of an anatomical or functional renal disease, but it is due to extrarenal factors. 10. The residual nitrogen values in the fully developed nervous complex vary extremely in different cases, values between 17.1 and 176.4 having been observed; there is no relationship between the residual nitrogen content and the nervous complex.

Time of Occurrence of Chorea.—R. Nordgren (*Acta Paedriatica,* December 16, 1922), in a study of the chorea cases in the Samaritan Hospital, Sweden, from 1909, found that chorea occurs more frequently in certain epochs than in others. An elevation in the frequency of rheumatoid affections coincides with or immediately precedes an increase in chorea cases. This would point to the rheumatoid affections as etiologically connected with chorea. In 343 cases of chorea, 193 had suffered from rheumatism. Chorea appears simultaneously or directly after other infectious diseases, such as scarlatina, tonsillitis, just as endocarditis (acute) usually appears after other infectious diseases than acute polyarthritis, although the latter is the most frequent cause. Psychic factors of an exciting nature may in some cases act as a contributing factor. Girls are more often affected with chorea than boys. In the author's 343 cases, 218 were girls. Chorea appears most often between the ages of five and fifteen years. Before the fourth year it is comparatively rare although it has been observed in infants of three years of age. The following shows the age incidence: Three to six years, boys nine, girls twenty-nine; six to eight years, boys thirty-one, girls thirty-eight; eight to ten years, boys forty-three, girls seventy-seven; ten to twelve years, boys thirty-three, girls fifty-one; twelve to fifteen years, boys nine, girls twenty-three.

Studies Upon Experimental Measles.—Charles W. Duval and Rigney D'Aunoy (*Journal of Experimental Medicine,* August, 1922) inoculated defibrinated human blood from a case of measles at the stage of temperature height into rabbits, with the production of a specific reaction analogous in all essential features to that of the human infection. Following a definite incubation period of from two to five days the animals showed a temperature rise concomitant with which there was a diminution in the total number of circulating leucocytes. The most striking objective signs were coryza, conjunctival injection, enanthemata and exanthemata. The mucous membrane lesions were similar in their physical appearance to the socalled Koplik spots seen in man. Repeated passage of the virus of measles through the rabbit seemed to increase its virulence. In the animals dying apparently as a result of the specific virus grave nephritic changes were evident. The authors also produced in guineapigs and rabbits as a result of the introduction into their circulatory and respiratory systems of filtered nasopharyngeal washings from cases of human measles, reactions similar to those obtained by the injection of blood from measles cases. The specific reaction in the rabbit is characterized by enanthem, exanthem, and pyrexial disturbances, and in the guineapig by pyrexia, marked leucopenia, and in the fatal cases grave nephritis. The authors believe that experimental measles is primarily a blood infection, the mucous membrane lesions being secondary.

Operation as Part of the Conservative Treatment of Pott's Caries.—W. I. de C. Wheeler (*Practitioner,* November, 1922) maintains that the conservative treatment in children is best without operation, but that all adults who cannot or will not endure prolonged treatment should, in the absence of special contraindications, be given the benefit of operation. The additional fixation obtained by a bone graft often determines cure in the patient who has not responded to nonoperative treatment. More rapid recovery frequently follows operation in cases of paraplegia. An active primary tuberculous lesion is not *per se* a contraindication to operation. Prudence dictates three months postoperative treatment in bed and rest should be advised for twelve months.

Experimental Mumps Meningitis. — Martha Wollstein (*Journal of Experimental Medicine,* December, 1921), by injecting sterile mouth filtrates from early mumps cases into the subarachnoid space of cats, caused signs of meningeal irritation, consisting of increase in the amount of cerebrospinal fluid, with an abnormal content of cells and globulin, increased intrameningeal pressure and consequent symptoms of irritability, ocular irregularity, prostration, and fever These meningeal lesions were then transmissible from one cat to another by using the cerebrospinal fluid. The latter did not contain bacteria at any time which grow with the ordinary culture methods.

Etiology of Scarlet Fever.—R. W. Pryer (*Journal of Laboratory and Clinical Medicine,* July, 1921) isolated a large coccus shaped organism from scarlet fever patients. In size it somewhat resembled a yeast. It has not yet been found in other conditions. Culturally the growth is strictly aerobic; the optimum temperature is 30° to 40°; it is spore producing, and grows on very alkaline media and on a medium deficient in meat products. The spores are resistant to heat, withstand at least two hours' boiling, but are usually killed by a temperature of 110° in the autoclave.

Primary Malignant Growths of the Liver in Infants.—C. B. Dansie (*Lancet,* July 29, 1922) reports a very rare case and reviews twenty-three cases found in the literature of primary malignant growths of the liver in infants up to two and a half years of age. Most of the cases occurred in the first six months of life. The author's case was one of a duct carcinoma, which no doubt originated in connection with the bile ducts as the cells composing it did not resemble the liver parenchyma, nor was the growth of a green color, which indicated that the cells of the tumor were functionating.

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CARDIOVASCULAR DISEASES

The Heart in Myxedema.—Sven Zandrén (*Zentralblatt für Herz- und Gefässkrankheiten,* July, 1922) finds that the characteristic symptoms referable to the heart in myxedema are the following: 1. Dilatation of the heart in both directions, no signs of a valvular defect or of myocarditis and a normal or subnormal blood pressure. 2. Subjective symptoms of dyspnea and palpitation may exist for a long time unchanged. Gradually there develop edemas, localized mainly in the lower parts of the body which reach enormous dimensions; the skin becomes thickened, it cannot be lifted in folds and it is cold and scaly. 3. There is a disproportion between the objective findings in the heart and the pronounced edema with the severe subjective symptoms of insufficiency. 4. There is no or only a slight therapeutic effect noticeable from the usual treatment of the heart, but an excellent result is seen from the administration of thyroid gland preparations. 5. In many cases it is possible to demonstrate slight somatic or psychic symptoms of hypothyroidism.

Digitalis in Cardiac Disease.—Henry A. Christian (*Boston Medical and Surgical Journal,* July 13, 1922) states that after a fair trial of various available digitalis preparations he is convinced that none are superior to digitalis in its simplest form, the leaves powdered and mixed with a sticky vehicle so as to make a pill. He goes on to say: Digitalis may be given in a single massive dose, or in a modified massive dose method, or in regularly repeated small doses. Any of these methods is effective. The chief difference lies in the length of time needed to produce a result. For the average cardiac case there is no real preference. In a few very severe cases the modified massive dose method is better. Occasionally the single massive dose may be lifesaving. When all is done and said, digitalis therapy is very simple. Just give enough of a potent leaf, prepared in any way, by any accepted method of administration, and the result is most satisfactory in almost every case.

Disorders of the Heart Mechanism.—J. P. Munroe (*Southern Medicine and Surgery,* July, 1922) presents the following summary and suggestions for treatment. 1. Sinus arrhythmia: found chiefly in children; disappears on exercise; calls for no treatment. 2. Premature contractions: lessen or disappear when the heart is accelerated by emotion, fever or exercise; drugs not indicated as a rule; multiple premature contractions indicate myocardial insufficiency, call for rest and attention to the gastrointestinal tract and any systemic or focal infections; bromides are sometimes useful; digitalis when the heart muscle is exhausted. 3. Paroxysmal tachycardia: rapid rate abrupt in onset and termination, not affected by position or exercise, often cut short by pressure on vagal nerve; neuropathic cause should be sought and treated; digitalis administered only when heart muscle shows signs of exhaustion. 4. Auricular flutter: rare; may be suspected when very rapid, regular pulse is suddenly halved; treatment, digitalis. 5. Auricular fibrillation: pulse irregular in rate, rhythm, and volume, disordered ventricular action, heart usually beats faster than the pulse; exercise increases the irregularity. Treatment, digitalis or one of its substitutes. Atropine, belladonna and hyoscyamus to be avoided. 6. Heart block: most often with a pulse rate of fifty or less; sudden drop while taking digitalis or in convalescence from acute diseases is suggestive. No treatment needed as a rule; digitalis not to be used; epinephrine or atropine should be given in severe cases. 7. Alternation of the heart: easily recognized by the use of blood pressure apparatus or, in cases of halved pulse by comparing radial pulse with ventricular beat. With hypertension and cardiosclerosis it indicates serious heart weakness and a fatal issue not far off; with normal blood pressure it may be relieved by digitalis.

Treatment of Cardiac Failure during Pregnancy.—H. E. B. Pardee (*American Journal of Obstetrics and Gynecology,* June, 1922) asserts that the important feature in a patient with heart disease during pregnancy is the degree of cardiac failure; if this is slight the disease is of little importance. Even the first attack of severe decompensation can usually be recovered from with proper treatment, unless the attack occurs during labor. Abdominal section is the operation of choice in the latter emergency, provided a low forceps delivery cannot be done. Ether preceded by chloroform is preferable as an anesthetic for these patients to gas oxygen. Oxygen inhalations from a mask are helpful to clear up a persistent cyanosis. Without severe cardiac failure or after recovery from it, most patients can be carried through to term or to an induced labor during the eighth month. During labor, one should watch for a pulse rate exceeding ninety-five or respiration exceeding twenty-five a minute, precordial discomfort, dyspnea, and cough, and should not allow these signs to become pronounced before putting an end to labor. In lesser grades of heart failure during pregnancy, the patient must rest enough to spare the heart from overstrain; this may not, however, necessitate rest in bed for more than a short time. Digitalis should be given in doses sufficient to insure an effect. With this treatment it will be possible to diminish the present mortality of about twenty-five per cent. in severe cases and ten per cent. for all cases.

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Vitamine C as Vegetable and Animal Tyrosin and Tyrosinase, Jointly the Homologues of Adrenalin Tests and Food Values*

By CHARLES E. de M. SAJOUS, M.D., LL.D., Sc.D.,
Philadelphia,
Professor of Applied Endocrinology, University of Pennsylvania Graduate Medical School.

The subject which President Anders requested me to consider at this meeting, the vitamines, was welcome for several reasons. First among these is the fact that the endocrine glands are increasingly being recognized as participants in the pathology of deficiency diseases, which means additional support of my contention of two decades ago that the internal secretions were of paramount importance in the genesis of disorders other than the pure endocrinopathies. A second source of gratification is that it affords another opportunity to urge that there is a true science of endocrinology distinct from the prevailing chaos so generally mistaken for it. A third reason is that it enables me to emphasize anew that researches in but one of the many branches of medical science cannot reveal the functions of the endocrine glands. This is shown by the failure of physiology to do so even during the sixty-three years elapsed since Claude Bernard initiated modern endocrinology and despite earnest physiological researches which, indeed, have yielded a vast array of invaluable data, though no actual function.[1] Finally, it permits me to add another link to the chain of evidence attesting to the supreme importance of certain endocrines in bodily functions. Those I have attributed to the adrenals, as we shall see presently, furnish at least a strong clue to the identity of one vitamine in both animal and plant life. The bearing of this statement may be gathered from the fact that Casimir Funk, in closing the second edition of his admirable book on the vitamines (1) recently issued, writes: "We must still await the investigator who, through tedious and patient work, will take the decisive step forward—the recognition of the exact nature of the vitamines."

A few high lights of the subject may prove helpful as a preamble. Beri beri or multiple neuritis had long been known by the Japanese to be in some way connected with a faulty diet, but Eykman, a Dutch physician, found in 1896 that while polished rice caused the disease in fowls, unhusked or red rice failed to do so. Vordeman then fed polished and unpolished rice to thousands of prisoners in Java and, as a result, urged the adoption of unpolished rice for State institutions. In 1909 Fraser and Stanton extracted from rice millings a substance which prevented and cured beri beri. Casimir Funk, of New York, then succeeded in 1911 in further concentrating this substance, and, considering as he did the basic group as an amine while desiring to emphasize its vital importance, called it "vitamine." Various substances other than rice millings are now known to contain the antiberiberi vitamine: yeast and germinating seeds particularly, then natural grains, nuts, certain vegetables, orange juice, milk, etc. This vitamine is generally known as the water soluble antineuritic vitamine B.

Equally important researches were conducted by our fellow member, Professor Osborne, with Professor Mendel, both of Yale, in 1912, who in experiments in rats covering a period of over a year, greatly advanced our knowledge of the food values of various proteins in their bearing on growth and normal health. This vitamine, which will be studied at length in another paper, was found to be present and soluble in certain fats and oils. E. V. McCollum, of Baltimore, independently reached similar conclusions in 1913. In addition to its influence on growth and general health, the fat soluble vitamine was found to influence profoundly the calcification of bone, as observed in rachitis and dental caries. It is known

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[1] This is the underlying cause of the present confusion in endocrinology. Without a knowledge of the functions of an organ, its symptomatology, pathology and therapeutics (including organotherapy) cannot be placed upon a sound foundation. I have long urged that a broad view of the subject, e.g., coordinated and synthetized evidence —facts only—from all branches of medical science, clinical and auxiliary, could alone solve so vast a problem. Hence the fact that the functions I attributed to the adrenals so deeply involved in the study of the vitamines have, as shown in the present paper, alone stood the test of time.

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as the "antirachitic fat soluble vitamine A." Cod-liver oil is richest in this particular agent; next come butterfat, cream, eggfat and green vegetables.

Scorbutus, including the infantile type, the adult form of which disease has been the bugbear of soldiers and mariners for centuries, and which during the last war was very active particularly in Mesopotamia, Serbia and Russia, has long been recognized as a deficiency disease. It may be prevented by various citrus fruits, certain fresh vegetables, especially tomatoes, fresh beer, germinating seeds, etc., the vitamine of which has been termed "antiscorbutic water soluble C." As scorbutus will form the basis of this paper, additional details will be considered later in their logical sequence.

Briefly, the dietary constituents which formerly were thought to be supplied by proteins, fats, carbohydrates and mineral salts no longer suffice to explain many morbid phenomena witnessed. To do so we must now take into account the presence of some food principle or principles, the vitamines, which are capable, when administered in time, to check with comparative promptness, several deficiency disorders which otherwise would end in death. It is not for want of effort that the nature of the vitamines has not come to light. Indeed, Funk's treatise alone refers to nearly sixteen hundred papers and monographs on the subject. Does this not suggest the absence of some dominating factor in the study of the subject? This factor, as will now be submitted, appears to be concerned with a function I attributed to the adrenals now nearly two decades ago.

A FUNDAMENTAL FUNCTION INHIBITED IN VITAMINE DEFICIENCY.

The process of respiration, including tissue oxidation, even as now taught in medical schools, is known to have been defective ever since 1856, when Vulpian, followed by Paul Bert, Müller and other physiologists showed that the diffusion doctrine did not explain the complete disappearance of oxygen in the lungs of strangulated animals, nor oxygen tensions in the arterial blood exceeding greatly those in the air of the bronchial tract.[2] These and other discrepancies led Bohr, a Danish physiologist, to urge in 1891, that a substance having greater avidity for oxygen than the blood itself was necessary to explain the respiratory process. He was sustained by other physiologists, Haldane, Lorrain Smith, Harley and others. The identity of the substance needed, however, remained obscure.

In 1903 I (3) submitted after laboratory studies in lower forms, of the biochemistry of fluids connected with the respiratory process, besides the anatomical relations of respiratory organs, clinical observations, etc., and a comprehensive analytical study of the literature of the various branches of medical science, clinical and auxiliary, that the secretion of the adrenals carried on this important function. Since it was formulated this interpretation has been sustained by experimental and clinical data from so many directions that, if evidence means anything at all, it imposes its acceptance as an important function of the suprarenal medulla.

This evidence, to which several branches of medicine contribute, includes among other data the following effects found to be produced by adrenalin[3]: It facilitates the free circulation of air in the pulmonary air cells by causing dilatation of the bronchioles (4, 5, 6); it converts venous blood into arterial blood on exposure to the air and also transforms hemoglobin into oxyhemoglobin (7, 8, 9); it increases the intake of oxygen, the output of carbon dioxide, the volume of air breathed, the respiratory excursions of the lungs and the depth and rate of respiration (10, 11, 12, 13, 14, 15, 16). As to its systemic effects, and in keeping with its power to convert hemoglobin into oxyhemoglobin, adrenalin was found in the blood and red corpulcles (17, 18); it raises the temperature even in small doses (19, 20, 21); it accelerates metabolism (22); the temperature is raised to such a degree, when large sections of the adrenal substance are grafted, and, irrespective of any infection, as to cause death (23, 24, 25); it causes when in excess, as in malignant adrenal tumors and regardless of their histological structure, a febrile course irrespective of any fevercausing complications (26); adrenalin produces even in doses as small at 0.5 c. c., as observed in seventy-three experiments in endocrine patients, an increase in the basal metabolism rate (27); it causes an increase in the intake of oxygen and in the output of carbon dioxide before accelerating the metabolic rate (28); and it increases in appropriate doses the excretion of urea (29). Conversely, as is well known, removal of both adrenals reduces the intake of oxygen, the output of carbon dioxide, and causes dyspnea; it lowers also the temperature, the urea excretion (30), and finally, markedly reduces the basal metabolism rate (31).

The importance of this interpretation and the array of confirmatory data submitted—of which the foregoing represent but a fraction—are especially suggestive in view of Halliburton's statement in the last edition of his *Physiology* (1921) (32) that "knowledge of tissue respiration is so scanty that we can say but little about its pathological bearing."

THE BEARING OF TISSUE OXIDATION THROUGH THE ADRENALS UPON THE GENESIS OF SCORBUTUS.

Returning now to the relationship between the adrenals and the vitamines, it becomes possible to understand the purpose of Lieut. Col. R. McCarrison's question in his recent work on the Deficiency Diseases (33) in reference to the identity of adrenalin: "Is it a mere excretion, as suggested by Gley, or is it a powerful hormone concerned in the control of metabolic processes?" To this he answers, as a result of his studies, that "an intimate relationship exists between the adrenal glands and the metabolic processes of the animal organism." To this he would have added, had my writings been within his reach in India: "as Sajous showed in 1903 (3), and has repeatedly urged since."[4]

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[2] C. R. Barnes (2), professor of plant physiology at the University of Chicago, having had occasion to "diligently examine" our "most thorough" textbooks of physiology, concluded that "the respiratory ratio has proved a veritable will-o'-the-wisp, leading investigators into a bog where their labors and their thinking were alike futile. For, as a sign of what is going on within, the respiratory quotient is absolutely valueless." In my opinion, the persistent great mortality of pulmonary and cardiovascular diseases and the lack of progress in many directions are mainly due to this fact.

[3] The term adrenalin is used here because the active principle of the adrenal medula was employed in practically all the experiments related.

[4] It should be remembered that while before I explained this process in 1903 "metabolism" was used as a random term by physiologists and others when referring to the adrenals, no one had explained it. Nor had any one established a connection between this organ and the respiratory process or tissue oxidation. The absence of this factor has also greatly hampered progress in our knowledge of metabolic diseases.

Another essential feature of McCarrison's researches is that "the functional perfection of the adrenal glands is dependent upon the balance of the food and upon the quality and quantity of its vitamines." To emphasize the importance of this fact in the process analyzed, I will again quote his words (34) in respect to scurvy: "1. A scorbutic diet causes depreciation in functional capacity of the adrenal glands in guineapigs. 2. The impairment of adrenal function occurs *before* clinical evidences of scurvy manifest themselves."[5] Another feature, the bearing of which will assert itself as we proceed, is that a scorbutic diet in guineapigs while causing "an increase in size and in weight of the adrenal glands" was found by McCarrison to cause "a marked diminution in the adrenalin content of these organs" . . . "less than half that present in healthy guineapigs."

In the light of the rôle of the adrenal secretion in tissue oxidation, all the biochemical phases of which may be produced by the experimental use of adrenalin, we have seen, a marked diminution of this principle should naturally entail atrophy or degeneration of the tissues at large including the various endocrines. I will quote as testimony an excerpt from Funk's (35) review of this phase of the question which applies to beri beri as well as to scurvy: "The first investigations in this direction were made by Funk and Douglas (36). The findings in pigeons showed that the thymus glands disappear; this was also noted by R. R. Williams and Crowell (37). The behavior of this gland in birds was then investigated further by McCarrison (38). Funk and Douglas made a histological investigation of pituitary, adrenals, ovary, testicle, kidney, liver, pancreas and spleen. In all these organs definite signs of degeneration were noted."

Applying these data to the pathogenesis of scorbutus in which the production of adrenalin is markedly inhibited, the feature to be borne in mind is that all tissues suffer not only from the effects of reduced oxidation, but also from deficiency of the specific hormones upon which their very structural integrity depends, the result in turn of the atrophic condition of the various endocrines. To give a few examples, the initial weakness, lassitude, fatigability, torpor, mental and physical, are typical signs of deficient tissue oxidation. The same cause, however, favors a trend toward tissue death, as illustrated by the fungous, purplish, ulcerated, gangrenous gums and the decaying teeth, and the general tissue disintegration. Another important factor in this connection is the vascular failure, due to deficient oxidation of the arterial muscularis and also of the sympathetic nervous system (which is penetrated by the adrenal oxidizing substances through its myoneural junctions). These effects by entailing relaxation of the arterioles, plus the abnormal fluidity of the blood, cause the familiar hemorrhages in all directions, including the subperiosteal tissues. The bones, moreover, suffer from deficient calcium metabolism owing to the thymic atrophy. The thyroid, likewise atrophied, fails to sustain systemic catabolism and also its important rôle in the antitoxic and bactericidal processes, now repeatedly confirmed, and in which trypsic enzymes take part. The pancreas, the source of the trypsinogen, being also atrophied, correspondingly reduces its participation in these defensive functions—carried on by the trypsic cytase (Metchnikoff), the "defensive digestive ferment" (Abderhalden), etc. The exposed tissues, the gums, stomach, intestines, etc., thus become the prey of pathogenic bacteria, greatly complicating the morbid process. Hence the degenerative changes in these organs, the multiplicity of gastrointestinal disorders observed and also the frequency of pneumonia in these cases.

On the whole, it seems evident that while it is the marked deficiency of adrenalin which underlies the genesis of scorbutus as a deficiency disease, it is because this adrenal product carries on tissue oxidation that its marked diminution causes this disease in both adults and infants.

The fundamental function inhibited by vitamine deficiency in scorbutus and infantile scorbutus, therefore, is plainly tissue oxidation.

THE IDENTITY OF THE ANTISCORBUTIC ENZYME IN ANIMALS AND PLANTS.

When recognition of the adrenal secretion as a participant in the respiratory process, both pulmonary and systemic, was urged, much evidence was adduced to the effect that this secretion contained an oxidizing ferment or enzyme which, in 1907 (39), owing to its identity and origin, I termed "adrenoxidase." To convey clearly the farreaching importance of the oxidases (a term introduced by Bertrand, of Paris, in 1896, to identify soluble oxidizing enzymes of organic origin) it may be recalled that tissue cells cannot subsist merely by absorbing oxygen, even when immersed in this gas. The oxygen must, as first held by the Swiss biochemist Schoenbein, in 1857, be ozonized, i. e., activated. The tissues, in other words, need a catalyst, or intermediary between them and the oxygen, whether the latter be free or combined as it is in hemoglobin. Now, adrenoxidase from my viewpoint is the adrenal constituent of oxyhemoglobin which, as we have seen, carries the oxygen from the pulmonary air to the tissues, the latter having a marked affinity for this gas. Owing to the catalytic, i. e., accelerating, powers adrenoxidase has upon the oxygen it carries, the tissues become as it were functionally quickened. It is as such that adrenoxidase becomes the fundamental antiscorbutic vitamine, and that in its absence or diminution, progress towards tissue death occurs.

What do foods contain that corresponds with adrenoxidase?

Among the many oxidases that biochemists have described, either by the name of oxidizing ferments since Planche, a French pharmacist, gave us the guaiacum reaction in 1810, there is one which corresponds in its physiological properties with adrenoxidase; this is tyrosinase, the oxidizing ferment of tyrosin. It is closely related to the alpha-amino acid of hydroxy-phenyl-proprionic acid, thus justifying, in view of its vital importance in deficiency diseases, the term vit-amin introduced by Casimir Funk. Casein, the principal milk protein, contains 4.5 per cent. of tyrosin; but fibroin, the main decomposition product of worm silk, contains as much as ten per cent. It occurs in the intestine during the digestion of protein substances and is found in hemoglobin, according to both Fisher and Abderhalden, in the proportion of 1.5 per cent.

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[5] The italics are my own.

The kinship between tyrosin, including its oxidizing enzyme tyrosinase, and adrenalin, including also its oxidizing enzyme adrenoxidase, asserts itself in the presence of Howell's (40) statement that while "the rôle the vitamines play in the metabolism of the body is entirely unknown," he also says (41) referring to tyrosin: "This active substance is designated in the literature under a variety of names, those commonly used being epinephrin, adrenalin, and adrenin. It is a basic body which gives a number of characteristic color reactions, and in alkaline solutions is readily oxidized to a substance that fails to exhibit the characteristic epinephrin reaction on heart rate and bloodpressure." The failure of tyrosin, when oxidized, to evoke these phenomena only adds testimony to its identity as adrenalin for the latter likewise fails to cause them when oxidized in vitro. This fact has led many to believe that oxidation renders adrenalin inert in the body whereas in reality it is because it requires the iron which is present in the hemoglobin to enable it to act as catalyst. This metal is also necessary to activate tyrosinase (42). F. M. Durham (43) in fact found that the latter only acted when at least small amounts of iron were present.

In pathology we find additional testimony to this effect. Thus, W. G. MacCallum (44) writes, referring to Addison's disease: "With regard to the pigmentation of the skin, the ideas are vague. Fürth has found that the ferment tyrosinase will produce a black pigment from adrenalin, but it is difficult to understand how, in the absence of the adrenal, such a reaction could aid in the enormous production of pigment seen in Addison's disease." But the difficulty disappears when we take into account, in accord with my views, the large reserve of adrenalin which its identity as a constituent of hemoglobin represents. This may be shown by the observation of Boinet (45) that in seventy-five per cent. of 109 rats from which he had removed both adrenals, hematoidin, i. e., broken down hemoglobin, was found practically everywhere in the tissues, including the lungs.

Zoological biochemistry contributes much to our knowledge of the identity of bronzing. Fifteen years ago (46) a study of this question led me to conclude that this pigmentation was due to an accumulation of the adrenal product and that hematoidin found broadcast was a similar substance. The skin of batrachians, frogs, toads, etc., as is well known, takes part in the respiratory process, and it contains fluids which on exposure to the air become brown then black, precisely as is the case with Addison's disease. Now, Abel (47) "found adrenin in relatively enormous quantity in the skin glands of the toad." Redfield (48) also found a substance similar to it in the metaphores of the horned toad. I had also in 1907 identified both melanin and bronzing as adrenoxidase. Bittorf (49) likewise concluded recently that the bronzing of Addison's disease was due to the formation of an oxidase in the cutaneous epithelium. Again, Hammarsten (50) refers to Gossard as having found tyrosinase in the macerated skin of frogs and toads; he also alludes to this author and to Fürth and Schneider, as being "of the opinion that tyrosin is the mother substance of the melanins." Tyrosin and adrenin are evidently similar bodies, a fact which applies also, therefore, to tyrosinase and adrenoxidase, their oxidizing enzymes.

An additional property common to all oxidizing ferments, including therefore tyrosinase, applies likewise to adrenoxidase, i. e., that of being able to act in infinitesimal quantities as catalyst and as such to activate free oxygen. Schäfer (51) found that fourteen millionths of a gram of the adrenal principle per kilo of animal sufficed to produce maximal effects. In these conditions it might be doubted that this could apply also to respiration; but while Halliburton (52) states that "respiratory pigments, such as hemoglobin, partake of the nature of ferments, for they have a catalytic action," in the evidence submitted concerning the rôle of adrenalin in oxidation, it was shown that doses as small as 1/60 grain of adrenalin increased the respiratory excursions of the lungs that equally small doses raised the basal metabolism rate, the respiratory exchanges, etc.

The temperature factors also emphasize the kinship in point. All investigators place at a relatively low temperature, i. e., between 60° and 70° C., the heat level at which vitamine C is destroyed. In the large number of tests carried out in connection with the food analyses submitted below, I found the limit to be about 67° C. But this applies to the tyrosin, and not to tyrosinase which stands 100° C. and even more. This corresponds with the resistance of adrenoxidase, the oxidizing principle of adrenalin, which as I urged far back in 1903 and 1907, withstands a temperature of 100° C. I. W. Rowe (53) also found in 1915 that ampoules of adrenalin solution stood boiling heat (100° C.) three hours without loss of activity. A third factor is the destructive effect of oxidation, including that produced by the air oxygen, upon foods. Adrenalin, we have seen, is readily oxidized by the air, unless, as I have pointed out, iron in the hemoglobin molecule endow it with catalytic properties. Vitamine C, as has been well illustrated by the labors of Givens and McClugage (54), Hess (55), Dutcher, Harshaw and Hall (56) in their studies of fruits, milk and vegetables, shows all three features.

The kinship between the respiratory rôle of adrenoxidase and that of plant life is further emphasized by considerable testimony including many personal tests, showing that a multitude of plants, other than those used as food, carry on their respiratory process by means of oxidizing enzymes acting with pigments similar in their functional attributes to hemoglobin in animals and hemocyanin in lower forms. Indeed, in the fall the variegated coloring of leaves, and the pink, carmine, red and brown of certain flowers known to contain iron, recall vividly the changes undergone by adrenoxidase, the homologue of tyrosinase, when slowly oxidized through gradual arrest of the capillary circulation. Woods (57) in fact found that "oxidases were responsible for the etiolation of green leaves" (58). Recently, Prof. Bürgi, of Berne (59), urged the therapeutic value of chlorophyll, which though itself deprived of iron, cannot be formed without it. As example, he mentions spinach in which chlorophyll is present in large quantity. As shown in the food analyses submitted below, spinach is rich also in its homologue adrenoxidase, and thus admirably suited as a food for the elaboration of hemoglobin.

VITAMINE C AS A PROMOTER OF TISSUE OXIDATION IN DIETETIC PROPHYLAXIS AND THERAPEUTICS.

In the light of the foregoing data, the antiscorbutic vitamine C acquires far greater importance than has been hitherto accorded it. Scurvy and Barlow's disease, i. e., infantile scurvy, no longer stand from my viewpoint as diseases *per se.* They become, instead, the expression of a morbid process due to inadequate power to take up oxygen from the air owing to deficiency in the blood of the adrenal secretory product—an anadrenia, we might call it—giving rise to a true systemic anoxemia. And it has been observed that such a condition, even in its incipiency, entails a vulnerability to disease.

In the present connection, its dietetic aspect, anadrenia becomes attributable to deficiency of the food constituent tyrosin and its oxidizing enzyme tyrosinase, which as adrenalin and its adrenoxidase, endow the hemoglobin with its power to take up oxygen from the air and carry on tissue oxidation. As such the vitamine C of foods subserves, as far as oxygen is concerned in these processes, the needs of metabolism and prophylaxis. In disease, it also sustains the efficiency of the defensive processes. During convalescence it is essential not only as promoter of tissue oxidation, but also as the fundamental factor of all processes of repair. Vitamine C thus asserts itself as of paramount importance in all functions, normal and morbid, a fact which emphasizes the practical value of knowledge concerning the quantity of this vitamine in the various foods.

Biological tests, i. e., tests in animals, mainly guineapigs in the present connection, have alone been employed so far to determine the antiscorbutic value of foods. The British Medical Research Committee, Funk, Osborne and Mendel, McCollum, and many other investigators have contributed much in this direction.

A very great drawback to food tests in animals, however, is the length of time they take—several weeks as a rule—and the many opportunities for error they afford. Animals of the same species often differ in their resistance to avitaminosis; the stage reached in the scorbutic process may be either beyond or within the limits of possible recovery when the curative vitamine is fed; herbivorous animals may fail to respond favorably to foods suited for carnivorous animals even though they contain the appropriate vitamine; the vitamine content may vary in a given food according to its relative reducing power, its age or freshness; the dryness of the air to which it is exposed, etc.

Chemical tests would remove practically all these difficulties since the food tested, whatever its condition, would stand on its own merits when actually tested; all disturbing features concerned with the animal itself would be avoided, while the time factor would be reduced to a minimum. As long as the chemical nature of the various vitamines was unknown, however, such tests could not, of course, be worked out. With the identity of the antiscorbutic vitamine C interpreted as herein submitted, however, it became possible to do so. An effort in this direction and the difficulties encountered are submitted to facilitate the labors of colleagues in any branch of the medical or dietetic field who may wish to contribute to our knowledge.

THE GUAIAC-H_2O_2 AND THE ADRENALIN-H_2O_2 FOOD TESTS FOR VITAMINE C.

Many disturbing factors had to be taken into account and overcome before satisfactory tests could be devised. Among these may be mentioned the multiplicity of oxidases in plant life, their sensitiveness to oxidation; the variability of various tissues in oxidase content, the degree of acidity of their juices, etc. Citrus fruits, for instance, are so protected by their citric acid that this must be eliminated along with its fluid carrier. Again, Mediterranean lemons will alone react both chemically and biologically. The tomato, although rich in vitamine C, affords an example of the extent to which it may be hidden, for whether fresh or canned, the seeds proved to be its main carriers.

Nor did the guaiac test as practiced ever since it was introduced by Planche in 1810, prove satisfactory in my investigations, mainly because the protection afforded to the tyrosin and tyrosinase by the food tissues varies materially. Covered more or less by other tissue substances, they often failed to influence the reagents. Again, the air was found to part with difficulty with its oxygen in many instances, a doubtful or negative reaction resulting where biological tests had positively shown the presence of vitamine C. A less tenacious oxygen carrier being necessary, hydrogen peroxide proved to be the most satisfactory of the many available. Yet this agent had long been associated by many with organic oxidations. This, however, proved on close analysis to be but a theoretical assumption, even though sustained experimentally, the phenomena being in reality due to the blood adrenoxidase. Indeed, Schoenbein (60) was unable with the most delicate tests to find in the blood even a trace of hydrogen peroxide.

Other technical difficulties encountered were the destructive action of hydrogen peroxide upon the enzymes and the fact that too weak solutions gave but fleeting reactions. After testing many solutions, the most practical was found to be the 1:3000, composed of nine parts of distilled water (thus avoiding contamination with organic matter, calcium, etc.) to one of the three per cent. solution available in shops. This will hereafter be referred to as the H_2O_2-1:3000 solution.

With this solution and fresh tincture of guaiac any food supplied with an oxidase will, with the technic submitted below, give a striking reaction. Yet, guaiac is a promiscuous reagent, being colored blue when enzymes other than tyrosinase are present. A controlling reagent more specific as regards the respiratory process thus became necessary. Adrenalin suggested itself, since in animal blood, our own, it is capable, we have seen, of changing bluish venous blood to red arterial blood. Its value in this connection is readily shown by a striking test within the reach of all. A piece of celery, selecting as white a portion of the stem as possible, is cut into three pieces. On the middle of two of these, an oval area about one half inch is teased and broken up. The three pieces being then set side by side, a few drops of tincture of guaiac are placed into the teased area of one outside piece, and a few drops of the adrenalin 1:1000 solution into that of the other outside piece, thus leaving the middle white piece as control. A few drops of the H_2O_2-1:3000 solution are then poured into both of the oval areas previously stained. In about thirty minutes, the guaiac stained area will have become amethyst blue and the adrenalin area blood red, these colors increasing in intensity for a time.

The need of the tyrosin and its tyrosinase in the food tested to obtain a positive reaction is readily shown by the fact that if either the guaiac or the adrenalin solution is treated alone to the H_2O_2 solution no coloring ensues. If tap water is used, however, there occasionally appears a slight pinkish tinge due to the presence of organic matter containing tyrosinase. Pure tap water, however, when not hard, i. e., free of calcium, may be used for the tests in ordinary circumstances. Again, it must be borne in mind that vitamine C is water soluble. The best results are obtained, therefore, when the food tested is mixed with a little water and thoroughly crushed in the mortar.

As used above for celery the tests are employed as standards for the highest vitamine C value and termed first class in the food lists given below, lower values as to intensity of coloring being graded second, third, fourth, and fifth class respectively. They correspond with the plus signs used by the British Research Committee and other investigators who have conducted tests in animals, the number of plus signs, from four to one, being reduced as vitamine values proved weaker.

Finally, it should be borne in mind that some reactions occur promptly, others slowly. Again, their duration varies; some are lasting but the majority are fleeting, the blue and red disappearing after varying periods and being replaced by a brownish hue corresponding in the variety of its tints with the bronzing of Addison's disease, the browning of certain leaves in the fall, etc.

FOOD VALUES IN VITAMINE C AND EFFECTS OF COOKING.

As determined by these tests, carried out and adjudged as to vitamine value irrespective of any prior reference to the results of biological tests by the British Committee and other observers, the approximate concurrence in the general results—what difference there was being a higher value in some instances shown by the chemical test—illustrated the value of both methods. This applies only to vegetables and fruit, however, so distinctly indicated in scorbutus. In the case of meats, the biological tests carried out in herbivorous animals proved evidently misleading for the chemical tests clearly showed the presence of vitamine C.

VEGETABLES.

First class.—The vegetables which showed this highest rating were cabbage, cauliflower, carrot, tomato, turnip, sweet potato, lima beans, egg plant and the small red radish. Of these the first five which alone had been tested biologically had given four plus and three plus.

Second class.—The second in color intensity were green peas, spinach, beet, corn, both grain and silk; wax beans, string beans, and large peppers. The biological tests of the first five, alone tested, had been three plus, while the string beans had been negative.

Third class.—The weakest, though very distinct in color intensity, among vegetables were the potato, onions (scallions) and squash. Biological tests had given two plus for the potato, which corresponds with the color test, but three plus for onion, the only two tested.

No fourth or fifth class occurred among the raw and fresh vegetables tested, all having shown sufficiently marked reaction to warrant their inclusion in the first three classes.

As to the effects of cooking, boiling apparently destroyed vegetable oxidases of tomatoes, even when their crushed seeds were tested, potatoes (also when fried), corn, squash, wax beans and sweet potato, all three first class vegetables when fresh. "Apparently" is used in this connection because tyrosin is destroyed between 62 and 67° C., according to the density of its cellular container, while its tyrosinase resists 100° C. (the boiling point) some time. Boiling, therefore, by destroying the tyrosin, prevents the reaction, but might not destroy its tyrosinase. As will be shown later, however, destruction of the tyrosin inhibits its adrenalin forming property, in keeping with biological observation. When the cooking was kept below 67° C., vegetables lost only about fifty per cent. of their reactive power in the guaiac-H_2O_2 test, while the adrenalin-H_2O_2 test yielded full value. This test was made with cauliflower which breaks down easily when cooked. Corn lost but twenty-five per cent. in the same conditions. Rapid heating seemed to do less harm to the enzyme than slow heating.

FRUIT.

First class.—Oranges gave a marked but fleeting reaction only, however, when the rind was included. Lemons failed in this class, probably due to the variety on hand and marked acidity. Seedless grapes (pulp) and pineapple gave first class reactions. Biological tests had given orange and lemon four plus, grapes, variety unspecified, one plus; pineapple, untested.

Second class.—This class included pears, peaches, cantaloupe (musk melon) and honey dew melon, all fresh and ripe. Biological tests had given for pears two plus, peaches three plus. Melons untested.

Third class.—Lemon pulp, apples, bananas, plums and cherries constituted this class, the banana making an unexpectedly good showing, close in fact to the higher class. Biological tests had shown for lemons four plus, apples one plus, bananas one plus, plums (fresh prunes) two plus. The higher rating for lemons is said to apply only to the Mediterranean variety (Alice H. Smith). Cherries untested biologically.

SALADS.

First class.—Lettuce, in keeping with the biological tests (four plus) fully merited this class. But celery, untested biologically, also stood high in this category as previously shown.

Second class.—Romaine, cucumber and parsley, all gave positive reactions in this class, though as far as I could find, never tested biologically.

BREAD AND CEREALS.

First class.—Of the foods of this character tested so far, but one seemed to merit this rating; this was cornbread, despite the fact that it had of course been subjected to oven heat, and even though corn itself was only rated second class. The cornbread tested, however, contained as usual both egg and milk.

Cornmeal mush, both boiled and fried, gave no reaction, in keeping with the results of biological tests with cornmeal. Any bread may, however, be made vitamine C active, by adding to it, as in the case of cornbread, agents rich in this vitamine (milk) which stand baking heat.

Third class.—None of the wheat flour breads or cereals in common use that were tested reacted positively. Bran bread with raisins and molasses, often used, also proved negative. But bran bread, graham (bran) crackers which had given negative results biologically, gave a clear third class reaction with the chemical tests, while another kind of bran cracker gave a poor fourth class reaction. Saltines, however, gave a good second class reaction.

MEATS.

In this connection my results, as previously stated, differed totally from those of biological tests which for "lean meat" whether raw or cooked, yielded only one plus, as to vitamine C. This result which had surprised some observers, because it did not correspond with the marked exothermic reactions of muscular tissue, is probably due to the fact that meat was tested in herbivorous animals. With the guaiac-H_2O_2 test alone—omitting the adrenalin feature because the color reaction, red, is too similar to that of the meat and its juices to give reliable reactions—the positive reactions coincided, in the fresh meats used, with the thermo-physical results. The remarkable effects of cooking in this connection must be considered with each meat. Nothing but fresh meat (no imported or Western cold storage meat at least) was used.

First class.—Mutton, both meat and juice, gave very clear first class reactions. Broiling did not impair it in the least, but boiling did so to the extent of sixty-five per cent. Lamb gave a distinctly inferior primary reaction, hardly a third class one, but both broiling and boiling raised it to the first class rate! A mutton or lamb chop when tender and somewhat rare, is essentially rich, therefore, in vitamine C.

Second class.—Beef gave but a second class reaction, though quite distinctly. Boiling, however, reduced it practically to *nil;* thus making boiled beef a negative food as to vitamine C. Roast beef, however, when rare, and its juice, afforded the same surprise as lamb: it gave a clear first class reaction. Broiled beef gave the full second class reaction. Sausages containing beef, frankfürter (hot dog) and bologna, also preserved their second class rating, doubtless because of their skins, which prevented full access of heat and water to their meat. Chicken dark meat gave a full second class reaction, but white meat nothing. Stewed chicken dark meat had lost sixty-five per cent. of its vitamine C activity.

Third class.—Veal gave a good reaction of this class, but dropped to nothing when boiled, a condition to which broiling also reduced it. Roasting, however, repeated the phenomenon observed in the case of beef and lamb, only that it raised the rating to first class!

Fourth class.—Pork fully justified the ostracism to which the Jewish religion has condemned it, at least with respect to its vitamine C content. Not only did it give a poor fourth class reaction, but it showed no improvement when broiled. Boiling, however, did not cause it to lose its reactive power.

FISH AND MOLLUSKS.

First class.—Only oysters and clams gave this reaction among the seafoods tried, no fish giving even the second class. In the third class smelts and perch gave a clear reaction, while the fourth class included halibut and butterfish, and the fifth class, scallops and cod. Shrimps gave no reaction. The adrenalin-H_2O_2 test gave a negative result in the fishes tested, all of which were of the "white blood" series. The red blood series was not tested. As regards biological tests, but two kinds of fish seem to have been tried: salmon and fresh herring, both of which gave a negative result.

As to cooking, the soft tissued butter fish retained its fourth class reactive property when broiled, but boiling annulled all reactive power in every fish tested, also in the lobster, despite the density of the flesh of this crustacean.

DAIRY PRODUCTS.

Fresh summer milk gave a marked first class reaction but only with the guaiac-H_2O_2 reagent, while with adrenalin-H_2O_2 reagent the reaction was but slight, a pale pink being alone obtained. Old but sweet milk, neutral to litmus, i. e., milk kept in the refrigerator just above the freezing point twenty hours, gave but a second class reaction with the guaiac-H_2O_2 reagent, and the same pale pink reaction with the adrenalin-H_2O_2. Biological tests had given two plus for summer milk and plus for winter milk, a rating fifty per cent. lower than the chemical tests have shown. Buttermilk gave a clear third class reaction. As far as I could find it had not been tested biologically.

Cream gave a fourth class reaction but probably due to partial milk content for the addition of fresh skimmed milk increased its reactive power. Restaurant icecream varied according to the kind tested: vanilla icecream gave a first class reaction, but this was doubtless due to the fact that whole milk had been used in its preparation. Chocolate and strawberry icecreams failed to give a reaction. No biological tests were available.

Butter which had responded negatively in the biological tests, gave a clear third class reaction in the chemical tests. Conversely, cheese "made with whole milk" gave biologically one plus, while the chemical tests gave no reaction with either Swiss, roquefort or plain American cheese. This result is probably due to the fact that cream, negative in keeping with fats, is their main constituent. Eggs, both yolk and white, whether fresh or stale, gave negative results both chemically and biologically.

As to cooking, boiling proved fatal to the milk as regards reactive power, when carried out in the open as in households. Eggs, negative normally both biologically and chemically, were not improved, as had been the case with most meats, by frying nor by poaching.

MISCELLANEOUS.

Nuts.—In the reports of biological tests all nuts used commonly as food are recorded as negative. The guaiac-H_2O_2 test gave first class reactions for the hazelnut (filbert) and the pecan; a second class reaction for almonds, and a third class reaction for English walnuts.

Mushrooms.—Three edible kinds were tested. The *clavaria Pistolarius* gave a first class reaction; the *hypholoma perplexum* gave a full second class reaction, while the *puffball lycoperdon* gave a fourth class but distinct reaction. No cooking tests were made.

Soya beans.—These proved surprising as vitamine C carriers, particularly in view of the fact that biological tests had rated them negative. Thanks to the kindness of Prof. Charles F. Hottes, of the University of Illinois, I was able to obtain seven varieties. Of these, the Manchu, Haberlandt, Mongol, Hong Kong, Early Black, and Wilson Black all gave very intense first class reactions, while the Ohio 1913 and Medium Early Yellow gave second class reactions. Their wealth in oil probably interfered with their antiscorbutic action in herbivorous animals, in keeping with results obtained with all other oils in vitamine C biological tests. It is obvious, however, that soya beans, particularly in view of their additional large vitamine B content, are entitled to special researches in dietetic prophylaxis and therapeutics. Heat tests, however, showed that twenty minutes' exposure to the boiling point destroyed their activity. This was preserved entire, however, when the beans were heated ten minutes at 65° C. We have seen that while tyrosinase stands 100° C., tyrosin is destroyed at 67° C.

An all important feature of the effects of heat on foods in general is that the destruction of tyrosin by cooking above 67° impairs its reactive activity in proportion to the protection afforded by its external covering and the rapidity with which it is cooked. Thus, with its hard covering, the soya bean lost but twenty-five per cent. of its reactive power though the heat was raised to 85° in twenty minutes. Had its skin been easily penetrable, ten minutes at 67° would have sufficed to annul its tyrosin value entirely.

All this applies also to other foods; hence the destructive effect of boiling on soft foods, and conversely, the advantage of broiling which embodies a salient advantage: that of being a dry process of cooking. A coating is formed in the external tissues of the food which lays the rôle of the soya bean covering, and protects the deeper tissues. Roasting is similarly protective in its effects; hence the value of roasted meats, which, we have seen, is even raised in the case of lamb and beef to the extent of twenty-five per cent. and in that of veal fifty per cent.

On the whole, the foregoing tests in one hundred and odd foods[6] indicate that cooking in water above 67° C. tends to destroy their tyrosin if the fluid can penetrate the tissues of the food. The vitamine C in these circumstances ceases to become a source of adrenalin, or at least of its precursor, Halle and others (61) having found that the systemic tyrosin was derived from p-oxyphenylethylamin before it became adrenalin. Even if the tyrosinase, which stands a temperature of 100° C., the boiling point, remains undestroyed, scorbutic phenomena result because the tyrosin factor was lacking. This accounts for the fact, shown by biological tests, that foods, autoclaved at high temperatures, caused scorbutus in animals, which were then saved by the same but unheated foods. It explains also the clinical observation that adrenalin and another oxidase, salicylase, were the only helpful agents of the many tried for scurvy during the late war.

The importance of vitamine C in prophylaxis has been referred to, but, of course, other vitamines are necessary to subserve the systemic welfare. Fortunately, the foods studied in the foregoing list practically all contain more or less of vitamines A and B, enough, at least, to protect the ubiquitous fanatic who, to avoid disease, will wish to limit his diet to vitamine C. Again, as I have pointed out elsewhere, it is probable that besides the adrenal homologue tyrosin (tyrosinuria, etc.), various bodies excreted, bilirubin, biliverdin, urobilin, etc., include at least adrenal products, and that the body appropriates from foods no more than its actual needs. What the body cannot do, however, is to compensate for deficient intake of vitamine C and if its rôle in tissue oxidation is taken into account, the list of diseases which its absence or deficiency favors directly or indirectly is, even on cursory analysis, an extensive one indeed.

In disease *per se,* it would seem as if the very life of the patient would depend, particularly in the acute infections of an adynamic type, upon his ability to muster his defensive resources. What adequate tissue oxidation means in this process is self evident. Vitamine C foods thus become potent adjuncts to pharmacological measures. Here again, however, a word of caution is necessary. As I have urged elsewhere (62) hemolysis and autolysis are directly influenced by certain ductless glands early in various infections, pulmonary, cardiac, vascular, intestinal, cerebrospinal, etc., excessive oxidation (hyperthermia) being an active factor in the process. That a diet rich in vitamine C would activate this morbid process is therefore likely. It would seem, therefore, that great circumspection is as necessary in the dietetics of the sick as it is in the use of remedies. This, in turn, suggests that knowledge of the chemical nature of the vitamines will enable us to increase the efficiency of our humanitarian efforts.

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[6] The author is deeply indebted to Miss Hazel Funk, of Bloomington, Ill., Miss Abigail O'Brien, of New York, and his son Dr. Louis T. de M. Sajous, of Philadelphia, for their assistance in carrying out the many procedures involved in the investigation.

A Diagnostic Criterion and Serum Therapy in Lethargic Encephalitis*

By M. NEUSTAEDTER, M.D., Ph.D.,
New York.

A great deal of literature on the diagnosis of lethargic encephalitis, socalled, has been published by clinicians in this country and abroad since 1917, when Von Economo described as lethargic encephalitis and Netter as *encephalite lethargique epidemique* the epidemic disease with symptoms referable mainly to lesions in the midbrain. It was since then observed that the entire neuraxis might be involved or the peripheral nerves only.

To summarize the reports of all observers we found that the prodromal stage varied in different epidemics and in different individuals. Thus it might have been ushered in with headache, meningismus, ophthalmoplegia and slight fever. Again somnolence and diplopia were a marked feature and in some regions inflammations of the respiratory tract, nausea and vomiting were superimposed on the above mentioned syndromes. Some observers reported cases beginning with radicular pains, or a Parkinson syndrome and no temperature. In several cases of my series choreiform movements or myoclonus with radicular pains were the initial symptoms. In most of the cases headache was a prominent symptom.

In the same way the subsequent clinical picture is so diverse that our difficulty in making a positive diagnosis is still more enhanced. The most common syndrome is that referable to a lesion in the midbrain. Here somnolence is the rule. Most commonly the motor cranial nuclei are involved. Thus we see ocular ptosis, partial or complete ophthalmoplegia, with strabismus or diplopia as the case may be, anisocoria and irregularity of the pupils, facial paralysis of the peripheral type and also disturbance of the intercalating neurons in the superior caliculi giving rise to a partial or complete Argyll Robertson pupil. Hemipareses and even hemiplegias with aphasia have been seen quite frequently. In one instance I have seen hemiatrophy of the tongue with paralysis of the same side. Optic neuritis and even papilledema have been reported. Impairment of the vestibular and cerebellar pathways were followed by ataxia and nystagmus. At times the basal ganglia became involved and with the Parkinsonian features, chorea, chorioathetosis or dystonia as a result. Some have reported spinal types with symptoms of transverse myelitis, syringomyelia and also those referable to anterior horn lesions. Then, again, neuritides with herpetic eruptions were the only symptoms. Various endocrine disturbances or even psychoses are reported as concomitants of the affection. The temperature range was between apyrexia and 106° F.

The blood picture, according to various reports, showed a white cell count varying between three thousand and twenty-five thousand. The spinal fluid was always clear and under slightly increased or normal pressure, its cell count ranging between two and five hundred. They were of the small mononuclear type exclusively or markedly predominating. The Wassermann reaction was negative, unless lues was present and the Lange test showed a curve elevation beginning on the left side and receding to the right in the majority of the cases, in some normal. The curve, if any, was typically meningitic.

It may be of interest to note the relative frequency of these signs and symptoms in the series of 103 cases seen in my private and hospital practice within the last two and a half years. There were sixty-four males and thirty-nine females; their ages ranged between two years and seventy-six years; temperature from 99° to 106° F. Headache was the most prominent symptom in ninety-three of the cases; vomiting twelve; hyperidrosis, twenty-one; lethargy, thirty-two; somnolence, twenty-nine; insomnia, twenty-two; vertigo, twenty-five; root pains, twenty; incontinence of urine and feces, six; herpes, two; blurred vision, twenty-eight; diplopia, twenty-two; ptosis, twenty-three; anisocoria, twenty-two; paralysis of the abducens, eleven, the facial ten, and the hypoglossal, three; dyspnea, six; hiccough, two; myoclonus, twenty-two; nystagmus, twelve; trifacial pains, three; hemiparesis or hemiplegia, thirty; aphasia, eight; chorea, five; Parkinson, eleven; hemihypesthesia, four; papilledema, nine; optic neuritis, four; epileptiform convulsions, four. Pathological reflexes: absence of abdominals, forty-six; ankle clonus, thirty-one; toe extension phenomenon, twenty-five; Argyll Robertson pupils, thirty-eight; irregular pupils with sluggish light reflex, forty; Kernig, forty-nine; rigidity of neck, fifty-one; psychoses, twenty-nine. The Wassermann reaction was positive (++++) in three cases.

It certainly becomes evident from the facts given above that neither the clinical picture nor the cytology, chemistry and serology of the blood and spinal fluid, so far as reported, gives any definite clue that may be looked upon as a criterion for diagnosis. In epidemics the acute cases with somnolence and the classical symptoms referable to lesions in the midbrain present no difficulty, but how about the mild ones and those without the classical symptoms? How about the socalled abortive types or those occurring sporadically? How about those with a positive Wassermann? What about these with papilledema that may justifiably be diagnosed as a brain neoplasm or abscess, especially with a blood count of twenty-five thousand white cells? Then, again, how about the spinal and peripheral nerve types? In all these syndromes we have no positive means of etiological differentiation, for they appear in consonance with the site of the lesion and not the particular etiological factor. So that without any specific criterion it is guess work at best.

Early in the epidemic many observers thought that the affection was a cerebral type of epidemic poliomyelitis. The majority of them, however, are now of the opinion that it is an entirely new entity.

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*Read before the Yorkville Medical Society, October 16, 1922, and the German Medical Society, November 6, 1922.

It must be borne in mind that the gross and histopathological picture of the disease is the same in both. Clinically there were reported cerebral, cerebellar, pontile, bulbar and meningitic types of epidemic poliomyelitis. Radicular pains were fairly universal in late poliomyelitis epidemics. Fraenkel-Hochwart called my attention to it in Washington at the Congress of Demology, stating that in former years no radicular pains were recorded in poliomyelitis. The blood and spinal fluid findings are analogous in both diseases, with the possible exception that in poliomyelitis a higher cell count in the spinal fluid was reported in some cases. The temperature range is the same in both. The etiological agent seems to have the same morphology, staining and cultural characteristics and resists and is destroyed by the same agents as that of poliomyelitis, if we are to accept Flexner and Nogouchi's findings in poliomyelitis and Strauss and Loewy's in epidemic encephalitis. The mortality rate seems to be about the same in both. The age and time incidence is decidedly different in the two. Poliomyelitis has a predilection for infants and children and epidemics occur usually in the summer and fall, while encephalitis attacks mainly adults and the epidemics are limited to the winter and spring. Paralyses in poliomyelitis appear with the fall in temperature, in encephalitis with the rise. Experimentally we find it difficult to transmit the virus of encephalitis to monkeys, while comparatively easy to rabbits. Poliomyelitis virus, on the other hand, is readily transmitted to monkeys and not at all to rabbits.

The similarities of both diseases remind us of the different variations of the same species of germs in given infections, as the pneumococcus and paratyphoid groups. It is indeed interesting to remember that the virus of syphilis, for instance, produces different clinical entities and even different pathological lesions, so that the possibility of variations in the species of Treponema pallidum is strongly suspected by many.

The similarities of poliomyelitis and epidemic encephalitis, baffling as they are, I have attempted to investigate experimentally. In 1919 in collaboration with Dr. Larkin and Dr. Banzhaf (1) we succeeded in establishing that the poliomyelitis virus was completely neutralized *in vitro* by the serums of patients convalescent from lethargic encephalitis and the mixture, when injected intracerebrally into monkeys, completely protected six animals from poliomyelitis. That serum of patients convalescent from poliomyelitis completely neutralizes poliomyelitis virus *in vitro* and protects monkeys against the disease has been established by Landsteiner, Flexner and Lewis, Netter and Levaditi, Roemer, Anderson and Frost, and others.

Encouraged by these results we were led to attempt a complement fixation with poliomyelitis antigen in spinal fluids of patients acutely ill with encephalitis, since in 1916 (2) we had had good results with complement fixation tests in spinal fluids of patients acutely ill with poliomyelitis, with this specific antigen. In collaboration with Dr. Hala and Dr. Banzhaf sixty spinal fluids of patients suffering from frank or suspected encephalitis lethargica were tested with poliomyelitis antigen for complement fixation. There were forty-three positives; of these sixteen were ++++, six were +++, eleven were ++, ten +, and three +; fourteen were negative. Of the latter three gave a positive Wassermann reaction, one turned out to be a traumatic meningeal hemorrhage, two spinal cord tumors, and three syringomyelia. I shall not dwell extensively on this point, since it is to be the subject of a special paper, but will indicate here that we may assume to have a valuable aid in the diagnosis of lethargic encephalitis in the complement fixation with this specific antigen; if indeed not a criterion.

It would logically follow from the positive results of these two phases of experiment that, since there is no specific therapeutic agent for the disease, the antipoliomyelitis horse serum prepared by me in collaboration with Dr. E. Banzhaf (3) at the Research Laboratories of the Department of Health, New York City, since 1916, might be of value in its treatment.

For this purpose we selected six cases in the neurological service of Kings County Hospital, thirteen cases in the service of Dr. Schwertfeger of the Lenox Hill Hospital, and five private cases. Only severe cases were treated. Mild cases or such as showed no alarming symptoms were given the usual palliative measures. Early in the treatment the serum was injected intraspinally, but we abandoned this method since we had a few severe reactions. Intravenously the results were more reassuring and there was hardly ever a reaction. Twenty to thirty c. c. were injected in twenty-four hour intervals and in one case, a very severe one, two injections were given in twelve hour intervals. Eighteen patients recovered completely without any sequelæ, one with a mild psychosis, and six died.

In order to judge the merits of the serum therapy I may describe four cases illustrative of my point of view and the series.

CASE I.—A. K., male, thirty-two years of age. Admitted to Lenox Hill Hospital on April 2, 1922, in the service of Dr. Schwertfeger. He was somnolent and vertiginous and his temperature was 99° to 99.8°. His neurological status was reported as follows: Nystagmus, ptosis of left eyelid, anisocoria, pupils sluggish to light, prompt to accommodation, left abdominal myoclonus and later radicular pains. He was losing weight rapidly. Superficial and deep reflexes were present. He was doing fairly well during two months following with expectant treatment although the spinal fluid poliomyelitis fixation was ++++. Early in June he became lethargic, his temperature rose to 103° and his general condition became alarming. His spinal fluid showed a cell increase, lymphocytes exclusively, globulin +, poliomyelitis fixation ++++. Antipoliomyelitis serum therapy was decided upon. He was given six intravenous injections of twenty c. c. doses in twenty-four hour intervals. The fever in the meantime was rising to 106°. After the third injection the fever receded only to rise again. After the sixth the temperature dropped to normal, the patient continued to improve and made a full recovery without any sequelæ. He left the hospital a week after the last injection and the only complaint he made to me was that he had a ravenous appetite.

CASES II and III.—Two girls, aged sixteen and eighteen years, respectively. One was admitted to the Kings County Hospital and the other to the Lenox Hill Hospital with choreiform movements of practically all the muscles of the body. The patient in Kings County Hospital was treated for seven weeks in the usual manner without any improvement. Her temperature was 99° to 100°. Intraspinous injection of her own serum according to the Goodman method had no effect. Her spinal fluid poliomyelitis fixation was ++. Five intravenous injections of the antipoliomyelitis serum were administered in twenty-four hour intervals. After the second injection marked improvement set in and after the fifth no tremor was noticeable. A week after the last injection she was discharged cured.

The patient in the Lenox Hill Hospital was observed for a month and received the autoserum treatment without any effect. Her spinal fluid was ++ positive with poliomyelitis antigen, her temperature normal. Three intravenous injections of the antipoliomyelitis serum were given with good effect and one week after the last injection she was discharged as cured.

Case IV.—M. F., male, aged fifty-six years. This patient was seen by me at his residence with Dr. Wynn on May 6, 1922, when he complained of general asthenia, insomnia, restlessness and headache. Neurological status: pupils irregular and sluggish to light, prompt to accommodation, fundi oculi negative. Reflexes: abdominals absent, cremasterics present, patellars brisk, achilles present, plantar flexion on right side, extension toe on left side, slight clonus on both sides, slight Kernig and neck rigid. Temperature 103°. Spinal fluid, not under pressure, no increase in cells, globulin +, fixation with poliomyelitis antigen +++. Within the next two days the fever rose to 106° and the patient became rather somnolent and began to hiccough. His pupils were now fixed to light, a complete Argyll Robertson pupil. He received five intravenous injections of antipoliomyelitis serum, two in twelve hour intervals and the rest in twenty-four hour intervals. The temperature dropped to normal after the first two injections, then rose again and after the fifth went to normal and continuel normal. Two weeks after the last injection the patient, fully recovered, went to Europe on a pleasure trip. He was seen in Vienna by Von Economo, who pronounced him completely cured.

The Wassermann reaction of all treated cases was negative and the Lange test showed the curve described above.

CONCLUSIONS.

1. Positive complement fixation of spinal fluids with poliomyelitis antigen seems to be a diagnostic criterion in epidemic encephalitis lethargica.

2. Antipoliomyelitis horse serum seems to be of value in the treatment of this disease in the absence of any other specific agent.

I desire to extend my thanks to Dr. William W. Hala and Mr. Janke of the Kings County Hospital and to Dr. Schwertfeger, Dr. Blumgarten, Dr. Garbath, and Dr. Cramer of the Lenox Hill Hospital for their kind encouragement and assistance.

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1215 Park Avenue.

Educational Methods of the Various Schools of Medicine and the Treatment of Disease*

By JAMES M. ANDERS, M.D., LL.D.,
Philadelphia.

The political philosopher rightly assumes that good government remains the greatest of human blessings. Aristotle observes that all settled states embody an aspiration to live well. That the progress and well being of a nation depends largely upon the character of its medical service and its sanitary status or health rate is now generally appreciated. It is, therefore, gratifying to note that at no previous stage of human history has the medical profession played such a leading rôle in the affairs of community and state as at the present day.

In America the modern physician has become a more useful social being than at any point in the nation's history. In a democracy like ours, however, the danger that the pendulum, which is never at rest, may swing too far in the direction of socializing medicine, is obvious.

Analysis of the past half century with all its marvelous advances in the medical and cognate sciences, shows that the record of the profession of America for this period is in certain particulars more or less pathetic. It would appear to bear some, at least, of the seeds of its own undoing, as will appear obvious hereafter. Progressive members of our profession naturally welcome the trend of recent medicine toward greater participation in practical community affairs and the correlation of the modern humanities; they likewise warmly welcome the material elevation of educational standards in our medical schools. On the other hand the modern program still presents defects, both from the viewpoint of medical education and of the public needs in relation to the character of medical service rendered.

The literature on the problems of medical education is extensive and the testimony, as would be expected, is not all in one direction. On account of the leading importance of the subject, one may be pardoned for participating in its discussion with the hope of helping to decide policy and crystallize public opinion. Fortunately, as already stated, cooperation between the medical profession and the public is growing steadily closer, chiefly through the efforts of professional organizations, local and federal health agencies and civic associations. Movements for the education of the public in hygienic living have been and are in progress, but there have not been formulated and put into operation proper plans for the purpose of enlightening the people in the fuller and saner use of medical art and science in the treatment of disease.

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*President's Address before the American Therapeutic Society, Washington, D. C., May 1st, 1922.

The primary purpose of this address, however, is the protection of the public against the ill consequences, which grow out of the wide divergence among our schools of medicine, with respect to standards of educational requirements and facilities for teaching. The time is at hand when efforts should be made to effect uniformity in the teaching of the scientific branches of medicine, more especially anatomy, physiology, chemistry, pathology and diagnosis, both in irregular and regular schools of medicine, since a knowledge of these subjects is indispensably necessary as a background for any rational system of treatment. If this were accomplished a certain, definite standard, considerably higher than that which obtains at present in some socalled schools of physiotherapy, would be reached. Again, the subjects before mentioned cannot be learned, as is true of many others, in the school of experience, after graduation. Simply to let the light of publicity play over the present educational system as it affects a most vital portion of the training necessary to make competent healers of human ills cannot be justly criticized. Surely, if credible testimony to show that in certain irregular schools preparation for the successful handling of the diseases to which man is liable is inadequate in important particulars, a strong moral sentiment in favor of bringing about the reform proposed should be easily possible.

A review of the present situation, given below, will convince the most skeptical that the requirements of the regular schools of medicine, in which we include homeopathy and eclecticism, demand that the student shall be properly trained in the scientific subjects mentioned above, while those of the drugless cults, e. g., osteopathy and chiropractic, demand far too little instruction in these subjects by comparison.

It might be found to be feasible to combine the institutional interests for the training of all medical students in the scientific branches enumerated above; this would tend to eliminate duplication of effort; but more than this it would insure to the public service founded upon knowledge that is essential to the pursuit of any form of practical study and treatment of disease. It seems to me the state should accept this dictum, and nothing less, in the interests of the general public.

I feel strongly that if a course, the equivalent of the first two years in a regular medical school, in these basal sciences, including diagnosis, were required of the students of all medical sects, the folly of attempting to treat every form of illness by physiotherapy, which has but a limited field of usefulness, would be universally appreciated by students. Obviously, unity of training in these subjects would deter many from taking up the various cults and isms now in vogue. The student would learn to recognize the importance of coordination and cooperation of the clinical and pathological phases of medicine; in short, their interdependence.

The triumphs of the laboratory, without which the modern clinical worker could not attain his aims, are to a great extent ignored by the osteopaths and the practitioners of other irregular cults. The laity should be informed of this fact and also that a diagnosis rarely rests secure upon either the clinical or pathological findings alone, but upon a complete composite picture of these jointly. At all events, the laboratory is often an aid in the search for the seat of diseases, which, be it recollected, may be located anywhere in the body, or may involve the entire organism, the teaching of certain sects at variance with this view notwithstanding.

We can excuse the superstitious efforts of the native Turk who aims to keep off disease by tying beads of bright color on the hair of his children, but it is not so easy to conceive of intelligent men and women seeking the professional services of members of a cult who display lack of knowledge of those basic sciences on which rational medicine must rest, when afflicted with more or less obscure and often serious disease. And yet this is taking place to an extent daily that is appalling to educated physicians. Indeed, it has been estimated that not less than one third of the population of this country is relying upon drugless cults and isms for relief from human ills at the present day.

Time was, within the quarter century last passed, when the medical colleges of this country were not of a quality to justify a feeling of exultation. Since then, however, undergraduate medical education has been standardized to a point at which it can be said to meet the needs of the general public with proper organization and the application of good business methods. This has been accomplished in connection with the regular schools of medicine largely through the labors of the Council on Medical Education of the American Medical Association.

The fact that a large portion of the general public, however, is patronizing irregular, drugless cults whose schools occupy a distinctly low position, the system of medical education as a whole in this country at the present writing is but little more satisfactory than it was a couple of decades ago. As stated elsewhere, "Without doubt, the regular schools of medicine have a just and decided claim to public recognition, and it is the clear duty of this association to impress the public mind with the fact that the difference in educational standards between regular and irregular schools of medicine is an injustice to the body politic, which the people themselves must recognize and then correct" (1).

In this era of social reconstruction the medical profession is called upon to bear no small part in the work of plotting the new chart. What history will record it did in this relationship depends upon leadership and character of citizenship. That distinguished statesman and farseeing member of the medical profession, Sir Auckland Geddes (2), in speaking of its civic side, laments the fact, shown by bitter experience, that doctors do not, as they should, all see "a little further and a little more clearly than the lay world in the direction in which the emotion of human betterment is driving us, those now middle-aged might live to rejoice at the recognition of medical science as the main basis of political action, for all political action aims, nominally, at least, to secure the health and wellbeing of the people." The preparation for this task involves not only mature citizenship on the part of physicians, but also the cultivation of the true scientific spirit.

It is to be deplored, therefore, that there are so many irregular practitioners whose training and professional work are not in relation either with the fundamental, scientific branches of medicine or that scientific spirit so necessary in the clinical study of disease. Investing, as they do, their practice with awe and daily committing flagrant impositions on the fear of human sufferers, the practitioners of the various newer cults are now menacing the very existence, progress and development of sane, rational, scientific medicine.

It seems to me that a real peril to legitimate medicine lies in the mass of people who patronize the pretenders engaged in these fundamentally defective practices, which should be displaced. Those who practise these cults enjoy special advantages and privileges by holding sufficient political power—an instance of class legislation, which should not be permitted in any well regulated social organization. Again, to have permitted these irregular schools to establish themselves at a time when our regular medical schools, almost without exception, recognized the importance of, and effected a vital union with, universities, is cause for the keenest regret.

It seems to me that in every possible way there should be public insistence on what it means to submit disease processes to men and women inadequately trained in physical diagnosis, laboratory methods and the scientific branches of medicine. There are mournful examples on every hand of those who overvalue the advantages of physiotherapy by such healers and as the result they find themselves in a worse plight than before, not to speak of serious disasters which are not rare.

Without doubt, if the accomplishment of the training in laboratory methods and fundamental sciences could be unified for all schools, regular and irregular, it would mean much for the progress of American civilization. We might then look forward with bright confidence to the early disappearance of certain sects which have come into vogue, each with a little virtue behind it, but which can never, as has been claimed, open the approach to the treatment of all forms of illness. The plan herein advocated embraces the thought that students from all schools would be required to qualify, by passing a single state board of examiners, for the study of the practical aspects of medicine, including treatment.

Obviously such a modification of the medical educational processes as proposed above can come only in response to a popular demand; only if the people get behind it. Meanwhile, time must be given for the development and crystallization of public opinion under the tactful and systematic efforts of those who see the necessity for the change advocated and share an active desire to bring it about.

It is always difficult to break down the barriers of custom, and it would be manifestly foolish to doom the result of our efforts to failure by merely giving expression to a few idealistic phrases. The present status of marked inequality in the requirements of different schools of practice, more particularly so far as the scientific branches are concerned, must be analyzed and repeatedly presented in detail to the public mind. This is the plan to be pursued no matter how slow and tortuous our steps in progress toward the goal that it is so desirable to achieve.

One of the most important things in this connection is the enlistment of all American medical organizations in a combined effort to establish uniformity of standards with regard to instruction in the scientific branches of medicine. In view of the importance of this question, it is here proposed that the American Therapeutic Society appoint a special committee with the object of seeking the coöperation of similar committees of other medical associations in the proper solution of this important problem. A moment's reflection will convince the members of these bodies that this is one of the ills of the healing art crying loudest to be cured, so that their active cooperation from the viewpoint of the highest motive should be easily obtainable.

The claim cannot be made that the change proposed in medical education is at variance with accepted dicta, hence smacks of radicalism, and is to be attacked as being intellectually dishonest or self-exploiting. Again, it is not an instance in which an effort is being made to stigmatize the inferiority of those who may in their ignorance honestly differ from the viewpoints of the regular profession; but of a desire to render a real public service—an ideal to which the organized medical profession as a whole has ever been committed.

As stated in the recent address by Dr. John B. Deaver, "We ask only that the individuals practising these cults and 'pathies' become so sensible of their responsibilities as to acquire an education similar in breadth and training to that which, after long ages, the medical profession deems prerequisite to the treatment of disease" (3). To a great extent at least it must be confessed, the regular profession is to be held responsible for the faults of the present status of the healing art. For example, massage, which had been neglected by physicians as a rule for more than a score of years, became superseded by osteopathy, which is now one of the leading and most popular drugless cults.

Unfortunately, the form of physiotherapy, masquerading under the name of osteopathy, pretends to be a "system of medicine supplanting all internal medication and as such is teaching its patrons false doctrines and systematically estranging them from the broad principles of medicine" (4). This regrettable situation, from the viewpoint of the public interests, gave birth later to other mongrels, e. g., chiropractors and neuropaths. Osteopathy is founded upon the idea that "all diseases are caused by either an interference of the blood or nerve supply, or both." To quote further: "An excess or lack of acids, a nervous irritation (nervous dyspepsia), a lack of tonicity (prolapsed stomach), ulceration and many other conditions may be traced to this little deflection of the vertebra from its natural position. What more rational treatment could there be than to have the position of the vertebræ corrected, the nerve forces released, the blood supply made normal and the chemical laboratory permitted to do its perfect work"? (5)

It is worthy of note, as an example of imposition on the fears of patients, that while the osteopath detects a dislocated vertebra in all subjects presenting themselves for treatment, the chiropractor almost regularly finds that two are displaced and need to be readjusted. It would seem therefore that the assignment of massage to a rank far below its merits by the regular profession gave opportunity for exploiting it in a modified form as a "cureall," under new and unfortunate names.

An added reason why irregular cults flourish is contained in a statement issued by the Medical Society of the County of New York, to wit: "Chiropractic publicity has been built upon the ruins of the public's shattered faith in patent medicines. The chiropractor realizes that the public seeks a simple explanation of the cause of disease and appreciates the public's impatience with intricate scientific explanations that are beyond the ordinary man's understanding." Public opinion with respect to the school of osteopathy, and the same is even more strikingly true of that of chiropractic, has been deliberately and consistently deceived and corrupted through propaganda, not only in the press but also through discussion.

There is another defect in the regular medical service of the country to which the organized profession has not been fully awake. Not only has there been a falling off in the numerical strength of the general practitioner, more particularly in the rural districts of this country, but he has found himself handicapped by a lack of instruments of precision and out of touch with modern laboratory methods, and as a consequence has been rendering a superficial and often an inferior medical service.

This unfortunate process of retrogression naturally has affected more especially those practitioners who received their training two decades ago and upward, while those who have entered the profession more recently, realizing the fate of their senior confrères, have been loath to enter this field of practice. The regular profession is confronted by the problem of establishing a more efficient medical service, more particularly for that large element of the population which lies between the rich and the poor—the great mass ministered to by the general practitioner. The two classes of society, the rich and the poor, are receiving ample care under existing conditions.

Doubtless those who practice irregular cults derive their chief support from this large middle class of society; they are persons who are selfsupporting and willing to pay, but cannot afford the charges made by a group of skilled specialists. It has been affirmed that this defect is met by the advent of the small community hospital with its well equipped laboratory.

In my view, a more effective remedy is the diagnostic or group pay clinic, rightly organized and conducted. The question of the abuse of these institutions by private aggregations of physicians does not concern the present discussion. In order to avoid misuse, however, diagnostic or group clinics should be created so far as possible only in connection with established hospitals and dispensary services. Again, their function includes the treatment of disease—a phase of activity which is too often overlooked.

Uniformity of teaching in the fundamental subjects should be one of the guiding principles of all medical education. The medical practitioner is poor at diagnosis and treatment if he is deficient in physiology and physiological chemistry and cannot interpret correctly scientific results from the clinical or pathological laboratory. And no matter how skillful in manipulation the osteopath may be, he is a pure empiric, feeble in clinical medicine, physiology and pathology—three branches which must be mastered to an appreciable extent and coordinated in the prosecution of the work of any practitioner. It is justifiable to assume that if the public were fully informed on the problem of choosing a proper medical adviser, acute diseases in particular would not be committed to the care of the osteopath or chiropractor, as is the case today, and thus often allowed to develop until they pass beyond human aid.

Let us next compare the standards of the regular and irregular schools so far as they relate to the basic scientific subjects. In the curricula of the first class medical schools, two years are devoted to these branches almost exclusively, after meeting the entrance requirements which are the first two years of a college course or, as is true of some universities, an A. B. degree.

On the other hand, a comprehensive series of facts showing the status of the requirements of irregular, yet legally recognized schools, reveals a strange contract. For example, entrance requirement of leading osteopathic schools is the equivalent of a standard four year high school course. When, as is the case in Pennsylvania, it is necessary to have credits for one year's work in physics, chemistry and biology in order to obtain a qualifying certificate, these subjects are taught during the first year of the osteopathic course, whereas the students of the regular schools have had collegiate chemistry and physics when they enter.

A glance at the following table will show by comparison the differences in hours between irregular and regular schools of medicine, so far as the scientific branches are concerned:

Subjects	*Irregular (Osteopathic, etc.)*	*Regular*
Anatomy	570 hours	752 hours
Physiology	118 hours	400 hours
Physiological chemistry	144 hours	284 hours
Pathology	260 hours	412 hours
Bacteriology	144 hours	206 hours
Totals	1236 hours	2054 hours

From what has been presented it seems to me that every fair minded person will admit that the state should provide laws and regulations that would unify the teaching of these important, fundamental branches of medicine. It should be made evident to the public that the same discrepancy obtains in favor of the Class A regular schools, upon comparison of the curricula with regard to opportunities and methods, which are fundamentally vital to the clinical branches or those that enable the student to arrive at a correct diagnosis and a basis for appropriate treatment.

The more urgent needs of these small yet constantly growing cults, however, are competent teachers and well equipped laboratories of chemistry, physiology and pathology, where students can be helped to trace the clinical manifestations, early and late, of diseases, back to their underlying causes. Says William H. Welch (6) in speaking of the marvelous activity and expansion of the laboratory in recent times: "This remarkable growth of laboratories for the cultivation of the various medical sciences has been at once the cause and the result of the rapid progress of medicine in recent years."

The question naturally obtrudes itself here, Shall the regular medical profession longer tolerate this situation without so much as a protest? What greater service could the medical profession render the public than to convince popular opinion that a certain standard of scientific attainment must be insisted upon for all, before the student can proceed to the practical subjects, including the cure and treatment of disease in the school of his choice. While this would be a large contract, it would be found to be practicable if it were possible to enlist the concerted action of all medical organizations, a solidified force with a definite propaganda, and if the American Medical Association were to assume the leadership in the movement.

The American Medical Association is entitled to speak with authority because of its great contribution to the cause of medical education and the spirit and influence of its activities in elevating the standard of qualifications of the regular medical service of this country. It seems to me that this organization, reinforced by other national and local societies, should be prompt in bringing its power to bear against the evils growing out of the minimal requirements in the scientific branches under discussion among our irregular medical schools, and should aim to effect a widely enlightened public and the needed modifications of existing laws and regulations. The American Therapeutic Society could be depended upon to assume a large share of the propaganda activities required and to this association will, I trust, belong the credit of launching the movement. Surely, if our legislators of integrity had their minds directed toward the present state of medical education as carried on by these newer cults, they could be depended upon to take a determined stand against it.

Unfairness to the regular schools as to entrance and graduation requirements ultimately will cause injury of a serious nature to the public health interests. Without doubt, if this fact were duly appreciated, revision of our state laws governing medical licensure would receive the endorsement of the enlightened element of the laity. Indeed, it would not be reasonable to suppose that intelligent, right thinking citizens, whether professional or lay, could rest in selfsatisfied contemplation of the situation.

The deficient teaching of physiotherapy in our medical schools is a side problem which may be conveniently referred to here. Failure of teachers to fulfill their duty in this respect has invited and inspired cults whose devotees are using a little technical knowledge ostensibly in the interests of the state, but in reality to reap pecuniary reward out of them. How to escape from this rapacious medical situation of today lies, in part at least, it seems to me, in a pedagogic reorganization of the teaching of therapeutics. The student's mind has been too much conducted into wrong paths in the past, e. g., into that of drug therapy, leaving him blind to equally important means to be found in the field of physiotherapy, including that most valuable measure, massage.

In this connection it is pleasing to record a departure from the old classical, traditional arrangement of subjects in textbooks in the valuable work entitled *The Principles of Therapeutics* by Thomas G. Osborne. Not only has he presented the subject in a way that must prove highly useful to the practising physician, but the physical measures have also been stressed to a degree commensurate with their actual importance as remedial aids. It is to be hoped that our undergraduate courses in applied therapeutics will be similarly modified to meet the urgent necessities of the medical profession in the future.

As a society we should make every effort to safeguard the interests of the profession by impressing upon the minds of those teaching pharmacology and therapeutics in our medical schools, the necessity for an all round training in those subjects so as to insure its complete availability for the general practitioner. The American Therapeutic Society if alive to ever threatening dangers, can in this manner also become ultimately the protector of the public. It is necessary, however, that we realize our responsibilities and appreciate our power when exerted individually and collectively to the fullest extent, in a matter in which the public is so vitally concerned. Surely, the present situation affords an exceptionally good opportunity to institute a movement in the direction of improved methods of teaching the treatment of disease.

The report of the committee, appointed one year ago on a plan for teaching therapeutics, will be, I trust, adopted by this society at the present session and a copy sent to the proper authorities of every medical school in the country. The curriculum presented by this committee of the whole membership and of which Dr. Oliver T. Osborne is the chairman, sets forth a curriculum for the teaching of the large and important subject of the treatment and management of disease, which embraces all useful measures. The American Therapeutic Society should realize that in supporting the report of the committee, it will be sustaining broad ideals and insuring the dawn of a new day in the teaching of therapeutics.

Another function of this society, that of elevating and improving the science and art of pharmacy, as well as maintaining a standard of professional ethics and honesty among pharmacists, is one meriting our serious consideration. Thanks to the persistent and well directed efforts of Dr. Francis E. Stewart, our knowledge of the meaning and results of the cooperation between the medical and pharmaceutical professions have been greatly facilitated. As a society, we should make greater efforts to educate these two professions in rational drug therapy based upon the United States Pharmacopœia. Let us use our fullest influence to the end that the line between the commercial drug business and the pharmaceutical profession may be a distinct and broad one; and establish the pharmacopœia as a guide in the use of drugs as remedial agents.

The medical profession has been justly assailed as neglectful of certain aspects of the science and art of therapeutics. For example, M. Nicoll, Jr. (7), pertinently remarks, "There is growing up a passion for diagnosis to the exclusion of medical care and treatment, save in those conditions for which specific remedies have been discovered." This is an added reason why patients, who seek relief from their sufferings, are applying in increasing numbers to pretenders, mountebanks and charlatans.

Says Wynn (8), in speaking of the application of the common natural agencies in relation to the cure of disease: "Physicians have failed, first, because medical schools have not taught these things thoroughly or systematically; second, because hospitals have not provided the facilities or a staff of teachers thoroughly competent to instruct; and, third, because nurses have not received efficient instruction in carrying out the methods. Neglect to give these subjects the attention they merit in therapy has been more responsible than aught else for the development of recent sects in medicine."

From the preceding discussion a comprehensive program for the protection of the public against incompetent and partially trained practitioners must have three principal purposes: 1, the creation of a common standard of entrance requirements for all schools and systems of medicine; 2, to bring about uniform training for all in the subjects of anatomy, physiology, physiological chemistry, pathology and diagnosis, followed by an examination by a single state board of medical examiners in these branches; and, 3, better and more comprehensive teaching of physical therapy, in our regular schools of medicine.

The attainment of the first two purposes necessitates, as emphasized in the foregoing discussion, the development of an intelligently educated public opinion. To this end, as before pointed out, we must harness all available forces in the medical world and those of allied agencies that make for communal betterment and national improvement. The third purpose, not purely from selfinterest, but from a far higher motive, demands the placing of teaching of the treatment of disease on a sane and solid foundation.

1605 Walnut Street.

A Medical School Curriculum Leading to Rational Therapy Recommended by The American Therapeutic Society

By OLIVER T. OSBORNE, M.D.,
New Haven, Conn.,
Professor of Therapeutics, Yale University.

GENERAL PLAN.

It is understood that the following plan is arranged for the regular four year course leading to the medical degree. Some changes would be advisable for colleges that have a five or six year course in medicine.

1. A good working knowledge of inorganic and organic chemistry is a necessary requirement for entrance into a medical school.

2. Biochemistry and physiology should be taught principally in the first medical school year, but the chemistry of the tissues and secretions, and nutritional and metabolic processes should be repeatedly presented to the medical student throughout his course in pharmacology and therapeutics, so that he will constantly bear in mind the functions and the chemical reactions of the diseased parts which he is called upon to treat.

3. Pharmacology should be taught principally in the second medical school year by assigned lessons in a textbook and by personal participation, under supervision of the instructor, in the demonstration of the action of therapeutically useful drugs. The close relationship between physiology and pharmacology should constantly be impressed upon the student.

Didactic instruction should be given and, when possible, quizzes based on textbook lessons should be held, on all useful drugs the action of which cannot be pharmacologically demonstrated, such as quinine, mercury, iodides, iron, and others. Also, such instruction should be given concerning the value of drugs used externally, as antiseptics, germicides, and those used as stimulants or sedatives to the skin and mucous membranes.

4. The principles of therapeutics should be taught in the first half of the third year, and must be preceded by the study of the pathology of disease, as unless the physiology and the pathology of a part, or of a diseased condition, are understood a rational application of therapeutic measures cannot be made.

5. Applied therapeutics should be preceded by the instruction in physical diagnosis, the clinical laboratory instruction, and the didactic and textbook instruction of internal medicine. Clinical instruction in therapy, that is, applied therapeutics, should be begun at the bedside, in the latter half of the third year and should continue throughout the fourth year. Didactic instruction in applied therapeutics should, during the third year, supplement the bedside instruction. The part that foods play in diseases of metabolism and the proper diet for each individual patient should be carefully presented to the student so that he will recognize the importance of dietotherapy.

Preferably hospital therapeutic instruction should precede dispensary therapeutic instruction, as more scientific diagnoses can be made and the results of treatment can be watched in the former cases. Also, all too frequently dispensary clinical teaching is given by clinicians who are not teachers and who do not have the time to give attention to the details of the dispensary cases. Therefore the young medical student, as yet unskilled in internal medicine and in the treatment of disease, acquires habits of carelessness, especially in therapy. Very many times he does not know of just what the treatment consists, especially the medicinal treatment, and modifications of diet are not carefully outlined to the patient, and, even if outlined, they are not likely to be carried out. Therefore, to repeat, dispensary instruction in therapeutics is many times a failure. It is a well known fact that more medical experience is required to properly diagnose and treat an office patient than a patient who is under constant supervision, as in a hospital bed.

Throughout the whole course of the student's hospital and dispensary clinical instruction the effect, success or failure of any drug or physical treatment given should be brought emphatically to his attention.

It would seem best that the student should learn early in his clinical course what rational therapy is, so that he may start his clinical career with a good basic knowledge of therapeutics, rather than to wait until the fourth year for such instruction.

6. While instruction in special therapeutic measures, namely, physiotherapy in all its branches, dietotherapy, and similar branches, should be given in the fourth year, the value of these measures should be discussed and taught the student throughout his clinical course, namely, from the beginning of the third year. While a great deal of time cannot be given to any one of these special physical therapies in the present crowded state of the curriculum in the undergraduate course, the importance of these various measures in individual instances should be repeatedly brought to the attention of the student.

If the student has not received, at some time in his previous three year course, instruction on not only the general subject of nutrition, but also on the problems of nutrition as related to disease and diseased conditions, such instruction should be given early in the fourth year. Also, if he has not received instruction on the intestinal flora and the relation of intestinal bacteriology to disease, and the relation of focal infection to digestive, nutritional and organic disturbances, he should receive such instruction during this fourth year.

It is unimportant whether the instruction in physiotherapy is given in part in the third year and the remainder in the fourth, or that it is all given in the fourth. It is important that each student receives some such instruction before he graduates. The better he understands the application and value of physiotherapeutic measures, the fewer of his future patients will seek pseudopractitioners.

SCHEDULE IN DETAIL.

Pharmacology, About One Hundred and Fifty Hours.

The basis of the study of pharmacology should be a book that has physiology, nutrition, up to date metabolism and biochemistry as well as physical chemistry as a background. Such a book on pharmacology should not only give the pharmacologic facts evolved by scientific investigation, but should also state the clinical reactions of drugs discovered by empirical methods. The student should be required to carefully study, in a textbook, the function, chemical reactions, and pharmacological activities of a drug before he assists in, or observes, the demonstration of such action by the instructor.

The action of only useful drugs should be shown to students in the regular course, and each student should take part, when possible, in the demonstration of the activity of these drugs. Laboratory demonstrations which have occurred in the course on physiology should not be repeated in the pharmacological laboratory except as needed to demonstrate the action of some drug; that is, laboratory demonstrations should not be duplicated in the two courses of physiology and pharmacology. Pharmacological investigations of new drugs or of poisons that are never used medicinally should not be given in the regular course, but may be utilized for elective research work.

It should be emphasized that it is impossible to demonstrate on animals in the laboratory the activity of many useful drugs. Consequently the action of these drugs must be learned from textbook and didactic instruction. Frequent quizzes should be held during this course. Throughout this laboratory course in pharmacology the students may be divided into groups (the best method) to serve as personal assistants to the instructors; or they may be taught in small classes by laboratory demonstrations. Two objects should be kept in mind: one is for each student to be able to closely observe the actual demonstration or experiment; the other is that a student should not be allowed to waste his time in a laboratory, standing around, doing nothing, seeing nothing, and perhaps hearing nothing. Too much time is wasted in the laboratories of medical schools.

TOXICOLOGY.

This subject should be taught by lectures and demonstrations, and the treatment of the principal poisons should be outlined. Though inorganic chemistry is a requirement for entrance into the medical schools, and such previous instruction may have included chemical toxicology, nevertheless some definite didactic instruction should be given on chemical poisonings, as well as on gas poisonings, and on poisoning by the drugs which are most commonly used with suicidal or murderous intent. The treatment of such poisonings should be thoroughly impressed upon the student, and he should be instructed, by demonstrations, in the methods used to combat such common conditions as illuminating gas poisoning and too profound ether and chloroform narcosis.

The number of hours required for such teaching depends upon whether such instruction is given in one course or in several departments; as, for instance, the instruction on the use of anesthetics and anesthesia may take up part of this instruction in toxicology.

It should be the duty of the instructor in pharmacology to especially emphasize the action of an overdose of a drug and the action of a toxic dose, and to outline the treatment to combat a poisonous dose of each drug while it is under discussion.

While it is not advisable to offer a rigid program for teaching toxicology, it should be emphasized that this subject has been neglected in medical schools, and many a medical man, in an emergency, wishes that he knew more about the symptoms and treatment of poisons. Also when he is called to the witness stand he quickly realizes his shortcomings in this line, unless he was forewarned and had time to read up the subject.

Instruction on toxicology should run coincidentally with pharmacology, and the special lectures necessary to complete the subject should immediately follow the course in pharmacology.

DRUGS AND THEIR PREPARATIONS.

While the term materia medica is more or less obsolete and the study of botany is unnecessary in a medical school, and while it is rarely that the medical man has any necessity for knowing the appearance of medicinal plants and crude drugs, there nevertheless should be a short lecture course from a laboratory table, really a demonstration, on the useful crude vegetable drugs and of the important mineral and chemical substances that are valuable in the medicinal treatment of disease. Also the instructor, who should understand pharmacy, should demonstrate the methods of making one or more of each of the various classes of pharmacopœial preparations, such as tinctures, fluidextracts, ointments, etc. Emphasis should be laid on the deterioration from light, heat and time of many of the organic drugs and their preparations, also on the changes that occur in the chemical drugs. In other words, the impression should be made upon the student that it is vital that his patient obtains a fresh preparation of a carefully selected and properly cared for crude drug. The refinements of assaying and the determinations of the alkaloidal content of drugs are not part of the medical student's or practitioner's work. He must rely on the honest pharmaceutical firm and the skilled pharmacist to give him the drugs and preparations that are up to standard, based on the requirements of the United States Pharmacopœia.

The instructor in this course should give the student a list of the various synonyms and the trademark names of similar drugs. He also should outline the most obnoxious of the nostrum frauds. The student should be shown the ingredients of many of the proprietary mixtures, and his attention should be called to the drug that is active, and its simplicity when stripped of its camouflage.

The tablet triturates that are valuable and useful should be shown the student, and he should be taught that when he uses a tablet containing a mixture of drugs he should always know the ingredients and their amounts. He should also be shown hypodermic tablets, the various ampoules for hypodermic medication, antiserum and vaccine preparations, and the packages in which they are marketed.

The instructor should also demonstrate some of the gross chemical and pharmacal incompatibilities. Physiological incompatibilities should be taught in the course on pharmacology.

Instruction should also be given in the weights and measures used in compounding prescriptions.

This whole course should consist of not more than twenty lectures, and should run coincidently with, or immediately follow, the instruction in pharmacology in the second year.

Toward the end of this second year or during the summer vacation between the second and third years, or early in the third year, one or two students at a time should be assigned to work as underassistants in the drugroom of the hospital or dispensary, in order that each student may observe, and when possible actually assist, under the instructor or pharmacist, in putting up prescriptions. This is the only way that he will learn, 1, the use of weights and measures, 2, the general appearance of drugs and their preparations, 3, the appearance of and methods of dispensing ethical ready prepared capsules, tablets and liquid preparations, 4, the method of compounding and dispensing prescriptions.

The number of hours required in this course should not be less than twenty-five, and wherever classes are small and opportunity offers, fifty hours is a better requirement.

The head of the department of pharmacology or therapeutics, in whichever department this course is given, should allow a student, when opportunity offers, to obtain this pharmacal instruction in the prescription department of some drug store, the student bringing a certificate of having spent the required number of hours as an assistant in such a store.

While some few medical schools may give a regular pharmacal course, in the present crowded curriculum it is unwise to require students to waste their time in a pharmacal laboratory. The method above outlined will give the student all the instruction he needs in pharmacy, and also gives him an understanding of what the pharmacist must do to properly compound or fill the prescription presented to him.

PRESCRIPTION WRITING.

This course should be given in the last part of the second year, and the primary instruction should comprise not less than ten hours. Instruction should be given by quizzes based on a textbook that describes weights and measures, dosage, methods of administering drugs and the method of writing prescriptions. Most textbooks on pharmacology devote a chapter to this subject.

It is urged that in view of the international use of the metric system of weights and measures and the use of this system by all scientific experimenters, the metric system be universally taught medical students.

The Committee of One Hundred on a standard curriculum for medical colleges, under the direction of the Council on Medical Education, some years ago reported through its subcommittee on pharmacology, toxicology and therapeutics (p. 14) that "Incalculable harm has been done by the common and convenient habit of writing prescriptions in hospital and dispensary practice by numbers instead of the ingredients." It must be granted that a student can learn but little of practical medicinal therapy by numbered or otherwise obscured medication.

A student cannot, after ten hours of instruction, learn to write prescriptions, but he can learn the general plan in that length of time. In conjunction with his course on principles of therapeutics, which should be given during the first half of the third year, the students should be repeatedly required to write prescriptions for drugs or preparations, as may be suggested by the drugs under consideration. They should write these prescriptions, as many at a time as seems desirable, and hand them to the instructor at the next lecture; he, later, should return them corrected to the students. It should be aimed to cover all of the common drugs by this method, the instructor advising the best method of administration and the amount required.

The students should also be taught to write prescriptions by the clinical instructors, both in the hospital and in the dispensary. It is only by this continuous personal instruction and personal criticism that a student will learn to write simple prescriptions of correct doses, to avoid incompatibilities, and to order the amount required for a given indication for a given patient. Also, very important, he will thus learn how it is best to order a drug, and how and when it is best for a patient to take the preparation.

He will also learn not to order too much or too little, or to order deliquescent drugs in powder or insoluble drugs in a liquid, or to order a minute dose of a drug in a powder or a large dose of a drug in a pill or capsule. He will learn how to write for ointments, liniments, ready made pills and capsules, and will learn how to use the Pharmacopœia. He can thus be taught to individualize his patient, and not to give the same mixture to every one who happens to have a cold, or a pain, in any other complaint. It should also be impressed upon the student to write legibly.

The better instruction given to the medical student in prescription writing throughout the third and fourth years, the less he will order unscientific pharmaceutical preparations when he is in private practice.

As Latin is not now a requirement for entrance into many of our medical schools, and consequently many medical students do not know Latin, it is not wise to attempt to teach them to write prescriptions correctly in Latin, and bad Latin is an abomination. It is better for a prescription to be written in abbreviated Latin as recommended by the Pharmacopœia, or even with English terms, such as water, peppermint water, wintergreen water, etc. The directions to the pharmacist should be in the usual Latin abbreviations, which the student should learn.

PRINCIPLES OF THERAPEUTICS.

Fifty hours should be devoted to this course, which should consist of recitations and explanatory talks based on a textbook. A brief review should be made of the useful drugs and their uses, based on a therapeutic classification and on their pharmacologic ability to meet the different indications. The valuable uses of the endocrine glands should be discussed; the various therapeutic measures should be described; the practical use of vaccines and serums should be discussed; diets outlined; various forms of physiotherapy briefly described; and instruction should be given in the treatment of chronic drug poisonings, chronic industrial poisonings, and emergencies.

Following is another quotation (p. 12) from the report referred to: "The Committee recommends unanimously and most emphatically that a thoroughly systematic and well planned didactic course in applied therapeutics or applied pharmacology be required. This should be directed towards teaching the principles and practice of rational treatment. It is therefore absolutely essential that the subject matter be arranged and presented according to pathological conditions and processes and not according to drugs. The committee again is unanimously and emphatically of the opinion that a course in therapeutics arranged according to drugs cannot be accepted as a substitute, and that any great amount of time devoted to such a course is largely misspent. Such a course places the emphasis in the wrong place and thus fosters a false and misleading attitude."

APPLIED THERAPEUTICS.

Some therapeutic teaching must be given by lectures or by book instruction, but the major part of this course should represent continual instruction at the bedside and in the dispensary. The instructor in applied therapeutics should carefully outline the treatment of a given patient, and in subsequent talks he should show the results (success or failure) of such treatment. The student should consider: the character of the contagion, if it is a case of infection, and the methods to prevent the infection of others (isolation, hygiene, care of all excreta); a specific antitoxin or antiseptic treatment, if such is available; the possibility or advisability of an attempt at abortive treatment; the treatment aimed at the lesion, if there is such, by local measures, drugs, or, if necessary, surgery; the amelioration of symptoms, by physical or medicinal measures, if treatment of such is indicated, such as pain, fever, cough, too high or too low blood pressure, heart weakness, hemorrhage, or the removal of effusions; the correction of disturbed functions, as evidenced by insomnia, delirium, coma, anorexia, flatulence, nausea, vomiting, constipation, tympanites, diarrhea, congestion of the kidneys, suppression or retention of urine, dryness of the skin, too profuse perspiration, evident disturbance of a ductless gland; the proper diet; and, during convalescence, a rearrangement of the diet, the administration of tonics, massage, or other physical therapy if indicated, and, if advisable, a change of climate.

The therapy should not be obscured by unlimited discussion of the diagnosis and of the pathology. In other words, the treatment of the patient who has the disease should not be relegated to oblivion. Even if he cannot be cured, his condition may be ameliorated and his functions and nutrition improved.

Constant emphasis, by the instructor in applied therapeutics, should be given to the physiological and biochemical processes which are disturbed by the disease which the patient has, and to the improvement that can be caused in the pathology of the disease. The condition of the patient's nutrition must always be kept in mind, and, also, how the disease affects his metabolism.

The student should be especially taught to seek all possible foci of infection: in the teeth, tonsils, sinuses, respiratory tract, gallbladder, gastrointestinal tract, appendix and genitourinary tract.

While most of this instruction is given the students in groups at the bedside clinic or at the dispensary clinic, very many disturbances of health, as well as many diseases, never reach the hospital or the dispensary, and instruction in the treatment of such must be given by didactic lectures.

PHYSIOTHERAPY.

It is not expected that, in the few hours suggested to be devoted to physiotherapy, a student could become at all fitted to administer these treatments. It is impossible, in the crowded curriculum for him to become expert in any specialty. The object today is to give him during his medical course a complete and perfected groundwork in the practice of medicine and surgery, and not a smattering of everything that is allied to medicine. However, he should not graduate without a knowledge of the value of all physiotherapeutic measures, and, also, an insight into the amount of study that is required to become expert in their application. If he decides to perfect himself in any one line of physiotherapy, he can take a postgraduate course under an expert to accomplish that object.

Exercise.—Two or three special lectures on this subject should be given, perhaps best by one of the instructors in the orthopedic department. But the value of exercise in certain conditions, and the harmfulness of overexercise in other conditions, should be taught in all of the clinical departments. A special elective course on the value of special exercises should be offered by the orthopedic department.

Massage.—Two lectures are sufficient to outline what can be taught didactically of this subject, and of the value of massage in general conditions and its special value in local conditions. As small as it seems, four hours of personal (each student separately) instruction and demonstration, best in the orthopedic clinic, is all the time in the curriculum that can be afforded to teach the student the actual physical workings of this form of physiotherapy. Few medical men will have the time or the inclination to do massage themselves. Also, an efficient masseur or masseuse is born and not made. In other words, not every man or woman who studies massage can become an expert, or will have the personality that will be acceptable to a private patient. In fact, for general massage to be successful, many times it is necessary to fit the operator to the patient, and an operator who is successful with one patient may not be successful with another. The value of massage should be taught the student throughout his clinical course.

Electricity.—Five hours of lecture and practical demonstration in the use of the different forms of electricity should be given the students as a class. Subsequently, each student should in turn be an assistant in the electrical treatment room of the hospital or dispensary for at least ten hours. He should not only be taught the value of the different forms of electrical treatment, but he should also be taught its limitations in therapeutic use. Examinations of paralyzed muscles should be demonstrated, and the value of the constant current, faradic, sinusoidal, d'Arsonval, high frequency, and diathermy should all be outlined and the practical application shown. Either in this course or in the course on radiotherapy, the value of heliotherapy and of quartz lamp therapy should be discussed.

X ray.—There should be four hours' demonstration of machines and technic of radiographic work and radiotherapy. The use of the x ray and radium for therapeutic purposes should be outlined and their limitations discussed. The value of and method of applying ultraviolet rays and the arc light should be described. Of course a student could learn but little, in the amount of time suggested, of treatment, of picture taking, or of the reading of the radiograms. There should be offered a postgraduate course in this very scientific branch of medicine, and coincidently should be offered a special course on regional anatomy. The seriousness of mistakes in picture taking and in reading of radiograms should be emphasized.

Hydrotherapy.—The outline of this physical measure should be taught in the course on principles of therapeutics. Therefore, one hour demonstration of an elaborate equipment, if such is available, will visualize for the student the methods of applying this form of therapy.

At some time during his course in the fourth year, or perhaps reserved for the first year of his internship in a hospital in such states as require hospital service before giving a license to practise medicine, the student should receive at least six hours of personal instruction in the methods of giving baths, sponging, douches, enemata, colon injections, the Murphy drip, and other methods. The young doctor should not begin the practice of medicine without a personal knowledge of the technic of these useful and necessary physical methods of treatment. He should know, when he instructs a nurse to administer these treatments, whether she is skilled or not. In other words, he should not leave these physical measures entirely to the nurse.

The use and value of the more elaborate hydrotherapeutic measures, mud baths, sulphur baths, steam baths, electric light baths, bakings, etc., can be learned only by a short internship in a hydrotherapeutic establishment.

Transfusions and other methods.—The textbook instruction on these subjects the student has already received in the course on principles of therapeutics. During the fourth year the students should be taught, in small groups, the technic of venesection, transfusion of salt solutions and of blood, hypodermoclysis, spinal puncture, aspiration, and similar procedures. Of course, during his internship in a hospital in his first postgraduate year the student should not only be the personal assistant in such operations, but should, under instruction, do these minor operations himself. It is not intended or supposed that every medical graduate could become skilled in the technic of the transfusion of blood or of salt solutions, or even perhaps in the technic of spinal puncture, as it is much better for a few physicians or surgeons to specialize in this work; but emergencies may occur in the life of every physician when it may be necessary for him to avail himself of the technic learned in the hospital.

PSYCHOTHERAPY.

Four or five lectures on this subject would seem sufficient for the undergraduate course, and they should be given in the latter part of the fourth year. Psychoanalysis and psychotherapy can only be well studied as a postgraduate elective, and then, like nursing and massage, only a certain number of medical men are fitted to handle this subject properly.

A working knowledge of this branch of medicine is essential, as well as is a good working knowledge of the disturbances of the endocrine glands. The better these subjects are understood and the more the patient is studied from the whole biological and metabolic standpoint, the more rapidly will treatment of his disturbances be successful, and fewer operations will be done. The undergraduate student should, however, be told that psychoanalysis is frequently overdone and is being utilized in quackery. While the study of mental attitudes, of nervous reflexes, of memory disturbances, and of vegetative and vagotonic symptoms are valuable in this neurotic age, it should not be forgotten that sometimes stopping the coffee or tea, or extracting a tooth, or doing some other simple thing may stop the symptoms and restore the patient to health.

OCCUPATIONAL THERAPY.

This is also a postgraduate study, but two or three lectures can well be given the medical student in the latter part of the fourth year, to interest him in this subject and to show him what is being done in this restorative branch of therapy. Illustrated lectures are very valuable to bring this work graphically before the student.

A Social Service Ward for Women and Children*

A Solution of the Family Problems of Venereal Disease

By VICTOR COX PEDERSEN, A.M., M.D.,
New York.

No hospital can do its duty unless it has beds for venereal disease patients. This term includes those who have had infections and still have them in communicable forms so as to require treatment and those who have had the infections but may not remain menaces, yet demand exact diagnosis of their status. These two groups comprise the class of disease acquired by voluntary sexual relations or innocently acquired by involuntary, commonly nonsexual contact. The term acquired disease suggests its antipode hereditary disease as a great question. There is no more important and difficult problem than the results of syphilis and gonococcal infections. The importance rests on social, economic, moral and medical grounds. The difficulty lies in the hapless attitude which the community too often persists in toward all aspects of the problem.

The social importance is found in the disastrous and disqualifying results in the patients and in society. Finances determine late marriages almost until the years of normal sexual functions are decreasing. Underpayment of the working and salaried classes results in bare subsistence for the earner himself and no worthy subsistence for the home. The false teaching that our sexual organization and its normal expressions are sinful leads to shame, hypocrisy and false pretense.

It is a reasonable viewpoint and one which may be defended, that the social elements of the problem are distributed a third to the male, a third to the female, and a third to society. Each of these three parties has its own mistakes and responsibilities. It is in human experience likely that they equal each the other in all relations and interdependence.

The economic importance devolves upon the fact that these diseases incapacitate both sexes and all ages during their acute stages and in their chronic periods may disable. Statistics in the military service are reliable, because the patients are under control. The average navy has in its hospitals the equivalent of the crew of a second class battleship. These diseases in the civil community equal them in the military service beyond reasonable doubt only the statement cannot be proved with equal clearness. These are the quantitative economics of veneral disease.

The qualitative determinations are the following general data. The major complications of gonococcal infection in the sexual glands of both sexes often sterilize. A very large number (about fifty per cent.) of operations on women for abscesses of the tubes and ovaries are due to this infection. Very many childless marriages are due not to sterile women but to men rendered sterile by gonococcal involvement of their testes and vasa deferentia. No longer are women subjected to stretching and curetting operations until the husband has been shown to be normal. Many women have nondevelopment of the womb with consequent sterility due to infection in babyhood or childhood. These devastating infections lead to arrested development and the abnormality of a child's uterus in an adult.

The moral importance is a subject by itself and requires little deep consideration for realization of its just measure. No ordinary words express the misfortune to society produced by those teachings which make human sexuality the object of contradictory viewpoints. The natural estimate is the sound one in realizing that sexual procreation is the real basis of plant and animal life. There is no other plan in the higher orders of creation. No other reproductive physiology is vouchsafed to man, hence the sexual method should be dignified and not degraded. The law of sexual relation is probably universal. Even in the lowest creatures which multiply by division, it probably exists in prototype just as these same creatures have muscular, nervous and digestive functions all in primordial degree, but sufficient to provide motion, sensibility and nutrition under our microscopes.

The artificial viewpoint as to sexual relations is a moral misfortune, because it sets up the proposition that those who are celibates are virtuous, although they really defy biological laws, whereas those who in obedience to biological laws live in normal sexual relations are less virtuous. This is the teaching of religious extremists and it has done more harm than good in the question. It is the moral extreme. It is the action which underlies the equal and contrary reaction of the mental and moral attitude of more or less utter laxity in the matter. This is the immoral extreme antipodal of the foregoing moral excess. Between these wide apart limits lies the middle ground that the law of life about us, which knows no great exception, is also the law of life for us and should not be disregarded or maligned.

With these bases, or axioms, a few words are permissible as to the scope of diagnosis and treatment work among the various classes of cases met in families and groups of the community. There is no doubt that farreaching good to the patients, the families and the community would ensue if every large community would have ward service for venereal men, women and children. In a city of ordinary size wards of ten beds each for men, women and children could be kept full and even have waiting lists. The foundation fact is that when syphilis has been discovered in one member of a family, all others in blood relationship or contact had best be examined. If this is not done, then many important cases will be missed and not treated. As an illustration, in a family in my practice the father died of cerebrospinal syphilis; the mother has the disease in a state of incomplete cure, the elder daughter has positive blood and spinal fluid tests and is receiving adequate treatment as far as her own ignorance and obstinancy

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*A contribution dealing with the economic and sociological sides of this problem and ward service will appear in the April issue of the *Journal of Social Hygiene*.

permit. The other children have negative blood and spinal fluid tests and have probably escaped the hereditary disease but must be watched. For such a group ward beds alone give the necessary facilities for detail and finality of diagnosis. Another family is that of a man infected for nearly twenty-five years. He had been treated with almost full success according to the established procedures of that epoch. I examined and found free of syphilis his wife and five children, yet he died of syphilis of the heart and arteries. Ward service alone is fitting for the study of these obscure and highly important cases.

With similar cases in great number in hospital and private practice and cited in medical literature in mind, a Social Service Ward for Women and Children was begun at St. Mark's Hospital in New York City in July, 1922. It is the purpose of this paper to note the plan, scope and results of the first three months of service.

For the benefit of any other hospital which may be contemplating the opening of such a service and which, like St. Mark's Hospital, has a social service group, it is well to note that whereas the ward is of, in and for St. Mark's Hospital it is temporarily independent of the hospital finances because the Social Service Committee and its friends meet the expenses. All accounting is kept separate as a temporary expedient and the plan is more easily developed and modified. Several private citizens on hearing of meritorious cases have given financial support. The average person is interested and will give generously to the cause if he understands the need of sound financial underwriting. It is intended to give this project an organized trial for two years, possibly three years. Of this period it has taken inevitably six months to detail the best management of the applications, admissions and discharges of the patients. The balance of the first year will pass in determination of the methods of dealing with the patients after admission and during their sojourn in bed. These questions have been fairly well settled but there are refinements and improvements.

The actual accomplishments during the first ninety days have been suitable announcements of the work to institutions, agencies and persons and the acceptance of practically all patients referred. With hardly an exception each bed has been filled all the time and a waiting list has existed either directly or indirectly.

Twenty-nine patients were received and fully diagnosed, and then returned for treatment to the agencies from which they came, or were referred for treatment to the Clinic of St. Mark's Hospital. Their case reports are classified into syphilis, gonococcal infection, nongonococcal disease and miscellaneous venereal cases. Each group will be discussed in the order named. Further classification is indicated as each group is considered.

SYPHILITIC INFECTIONS.

The syphilitics are subdivided into suspected syphilis, established syphilis (independently of the clinical stage) and congenital and hereditary syphilis. The chief point is to keep together the patients of each group and subdivision, first in disease relations and second in numerical sequence, although the plan fails to observe the numerical order of admission. Suspected syphilis numbered four. In the diagnosis of syphilis lie two principles. If the patient has or has had the disease he himself and his physician must know the fact and the degree of the disease. In no other way can the patient be induced to submit to and the doctor plan for right treatment. If the patient has not and has not had syphilis he himself and his physician must know this fact. In no other circumstances will the patient be relieved from fear of the disease and the doctor from ordering unnecessary treatment. In the Social Service Ward care has been taken to observe four essentials: 1, A good record of the patient and his civil connections (mate in marriage, children, parents, brothers, sisters, etc.); 2, a complete physical examination with special reference to signs and stigmata of syphilis; 3, a full laboratory investigation including the blood and spinal tests, and, 4, the results of active treatment or of the temporary arrest of treatment. The following notes of the cases are epitomies for the sake of omitting medical detail which might be wearisome.

CASE I.—Diagnosis, suspected syphilis. E. F., twenty-one years old, married, no occupation, born in the United States. Admitted on July 8th, discharged on July 12, 1922, improved. Her husband, with locomotor ataxia, could not be reached for tests. It, therefore, became essential to admit and examine the woman, because, if syphilitic, the mother would have to have active treatment to control the disease in her unborn baby. As an applicant for a maternity hospital every test was performed. No gonococcal infection was found. The Wassermann blood test by the maternity hospital was strongly positive. Another by a private laboratory was less positive and a third by the Department of Health was negative. This confusion of tests required admission and study. The Wassermann test of the blood was mildly positive, almost negative, while the spinal fluid was negative. This woman was made an observation case and referred to one of the maternity hospitals for control and confinement. If it is shown that she did not have syphilis has not the work been well done? If observation proves mild syphilis, without effect on her spinal fluid, are not the relief she will obtain and the protection her baby will receive ample reward? Jeans (1) found 85.9 per cent. of mothers of syphilitic children to have positive blood tests and several mothers to show old signs of syphilis although their blood tests were negative. The unborn child will be benefited or cured if treatment is given during pregnancy.

CASES II and III.—Diagnosis, suspected syphilis. S. R., twenty-eight years old, housewife, born in the United States, admitted, with infant son, and discharged October 5, 1922. There was probably syphilis in this family. The blood test had been ++ on September 14, 1922. The woman and her infant were admitted for spinal puncture. The woman refused treatment or examination and left the ward promising but finally refusing to return. Refusals of cooperation are not uncommon among the ignorant, particularly if the source of the infection—husband or wife or both—has been pronounced "all right" or it is desired to hide the facts. Two per cent. of the patients refuse but they thereby remain probable menaces. The law does not reach them unless they have open lesions and are actual menaces. The mother and sisters of the woman have a history of syphilis. This patient is in reasonable health but probably has late hereditary syphilis.

What refusal of diagnosis and treatment may lead to is contained in Case 73 of Solomon and Solomon's *Syphilis of the Innocent,* as follows: "Case 73. The father and mother had 'sores,' probably chancres, which received local treatment only. Their first child was stillborn and the second child died of hemorrhage of the cord. Before the death of the second child, the parents reported for treatment but refused to continue it. Two years later their fourth child was found to be syphilitic. The third child had died at the age of three weeks. When the diagnosis was made on the fourth child and treatment instituted, the parents agreed to systemic treatment themselves. How much better if they had done this earlier. One always has to reckon with the individual equation. Education and efficient followup are necessary in these cases."

The cases of established syphilis comprised eight patients.

Case IV.—Diagnosis, syphilis, first and second stages. M. O'R., thirty-three years old, divorced, factory hand, native of Ireland, admitted July 15th, discharged August 2, 1922, improved. Married thirteen years ago, separated from her husband four years. She had had five pregnancies; three of the children died in infancy and the other two later. Denied sexual irregularities. Four weeks before admission she attended a party at which she became dizzy and unconscious through wine and dancing. On the day of admission she noticed a generalized eruption on her forearms and body. Typical secondary eruption and a small chancre in the vagina were present. Wassermann blood tests were strongly positive. As this woman worked in a food factory her disease was fully controlled before she was discharged from the hospital, in accordance with regulations of the Department of Health.

Case V.—Diagnosis, syphilis. G. A., thirty-seven years old, married, native of Norway, housewife; admitted July 24th, discharged August 11, 1922, improved. Married three years before admission, two pregnancies, the first ending in miscarriage. While in quest of employment, examination of the blood discovered syphilis. The skin was undoubtedly syphilitic. Lymphatic glands were enlarged. In the child, born before the mother became infected, all tests were negative. Very strongly positive blood tests in the mother were obtained on July 24th and August 9th. Under continuous intensive treatment the activity of the test was reduced by half. Rapid control of the disease protected not only the employers in the future but also her baby in the present. Hence a real economic question was properly settled. As she might become a nurse for children full diagnosis for gonococcal infection was performed and no signs were found.

Case VI.—Diagnosis, pregnancy and syphilis. H. S., twenty years old, born in the United States, no occupation; admitted July 26th, discharged July 27, 1922, improved. For about two years had been a common law wife and contracted gonococcal infection about a year before admission. The patient remembered a small sore in her vagina which disappeared after two injections of salvarsan. She had been pregnant nine months and delivery was due about the fourth of August. Wassermann blood test was very strongly positive. One dose of salvarsan was given on admission. The immediate onset of labor made it necessary to transfer her to Bellevue Hospital where the care and housing of infectious syphilis are more feasible than in a small institution.

Cases VII and VIII.—Diagnosis, syphilis. M. S. and baby. The mother was twenty-two years old, a laundress, born in the United States; admitted August 4th, discharged August 16, 1922, improved. This woman was delivered at a hospital, where the Wassermann blood test was positive. The general history and condition of mother and child were negative. She was referred to the ward for decision as to syphilis for her own as well as the baby's sake. The examination of both patients was negative. A control Wassermann test of the blood was again strongly positive and that of the spinal fluid was negative. It was safe to treat the woman as syphilitic for a brief period as a further test and as a protection of the baby. As the child developed slight irritation of the eyes the mother was fully examined for gonococcal or nongonococcal suppurative infection. Nothing was found by the laboratory which was corroborated by early recovery of the eyes. These patients removed to Pennsylvania, with instructions as to continuing the treatment there. The social importance is the observation and treatment diagnosis of the mother for her baby's sake as well as her own. As the child was so well it was considered unnecessary to subject it to the tests for syphilis until after observation and treatment of the mother. Physical examination did not reveal syphilis. Removal from the city obstructed final analysis.

Case IX.—Diagnosis, syphilis of the nervous system. L. J., thirty-two years old, married, white, housewife, born in the United States; admitted September 1st, discharged September 14, 1922, improved. This woman was infected about fifteen years ago. She had had one miscarriage. She had constant headache, which meant probably a low cerebral meningitis. The muscles of her eyeballs were partially paralyzed so that she was walleyed and her eyeballs bulged unnaturally. The woman was treated energetically at the reformatory so that tests of her blood and spinal fluid were more favorable than would otherwise have been the fact. Examination of the eyes showed that their refraction was still good. The importance of the case lies in controlling the syphilis and the paralysis of the eyes and the meningitis, thus preventing mental breakdown. The immediate response to treatment was only partial; unfortunately after discharge she discontinued treatment.

Case X.—Diagnosis, gumma of the leg. A. F., twenty-seven years old, married, housewife, native of the United States; admitted September 6th, discharged September 21, 1922, improved. The woman had had a profuse discharge from the vagina for years, even during her childbearing. No infection of gonococcal or nongonococcal type was proved. The husband was under treatment at a clinic and the wife had had a few doses of salvarsan but no regular treatment. There had been nine pregnancies, one miscarriage, two children dead. Three children were found to be free of syphilis. Although the tests of blood and spinal fluid are important diagnostic means, negative results in each of them, even when taken at the same or different times do not exclude syphilis. The diagnosis may be complete as in this case by such signs as gumma. Judgment is required to bring into relation general and local symptoms and all laboratory findings.

CASE XI.—Diagnosis, syphilis, third stage. C. C., forty years old, married, housewife, United States; admitted September 22nd, discharged September 24, 1922; improved. This woman is making a fight against locomotor ataxia. She has been a patient of the Urological Clinic for many years and her condition is improving. She has been receiving intraspinal treatments. The Social Service Ward cannot do higher work than study to guide the treatment in such cases or to aid her to keep body, soul and home together.

Syphilis descended from parents to children is now classified as congenital (if infection occurs *in utero* directly) and as hereditary syphilis (if without direct infection *in utero* the child's development is impaired). Nonne (2) regards congenital syphilis as the preferred scientific term. There were four patients of this type admitted.

CASE XII.—Diagnosis, syphilitic cerebral epileptiform seizures. A. B., seventeen years old, single, packer, born in the United States; admitted July 27th, discharged August 11, 1922, improved. Since about her seventh year she had had convulsions with unconsciousness lasting an hour and accompanied with biting of her lips. These seizures did not begin in any one part of her body and gave no special warning. The child asserted that the landlord of her home forced her when she was about eight years old. She did not remember any result of this attempted intercourse, such as a sore or a discharge. If she was then inoculated with syphilis it was unlikely that the seizures would have begun at the same time, if they were due to syphilis. It was likely they were due to hereditary syphilis. The examination of this girl by the Department of Nervous Diseases excluded hysteria and true epilepsy. Hence there was added reason for regarding the case as syphilis of the nervous system. During one of these seizures she fell on the street and was taken to a hospital where her blood Wassermann was found positive. This was the first lead to her condition. One obstacle in all this work was met in this family. Both the father and mother refused to have their blood tested and each violently accused the other of having acquired the disease. There was no moral doubt of guilty knowledge in one or other parent. Likewise the brothers and sisters refused to be examined. Hence the complete line of family data could not be ascertained. Such obstruction to service by families is disappointing but we must pardon the errors of ignorance.

The bearing of syphilis in the parents upon the children is demonstrated by Case 54 of Solomon's recent work. "Case 54. Mrs. W. was informed that she had syphilis when she was twenty-three years of age, but neglected treatment. She bore five children. The oldest had poliomyelitis at two years. The second at the age of nineteen was unable to walk normally, was sullen, morose and unwilling to work. The third boy at the age of eighteen was weak and sickly. The fourth child had been under antisyphilitic treatment for five years but had not thriven. She was about fifteen years of age, nervous, excitable, moody, easily depressed, and high tempered. The fifth child died immediately after birth. The relationship of syphilis in the parents and psychoneurosis in the children is interesting."

CASES XIII and XIV.—Diagnosis, suspected hereditary syphilis. G. F., four years old; M. F., six years old, white, born in the United States; both were admitted August 31st, and discharged September 2, 1922, improved. The father had had syphilis; on November 8, 1920, his blood was strongly positive. Since the father was a syphilitic, the wife and the children themselves and the community at large had the right to demand that the status of the whole family be diagnosed and, if they too were syphilitic, that they be treated and cured. The physical examination and blood tests of both children were negative. In order to rule out error and to protect the other members of the family the remaining four children were examined as clinic patients; four boys aged eight, ten, twelve, and fifteen years. All were negative. From these data the conclusion is reasonable that the father—if infected—acquired the affliction after the birth of the youngest child. False economy might indicate that so much work in a whole family in search of possible infection is misspent effort and time or that it would save money to wait for signs of the syphilis in the unfortunate member or members of the household who had in fact inherited the disease. Is it not better sociology to prevent late syphilis in brain, spinal cord, eye, ear, liver, etc., than to treat it after it is deeply seated and probably no longer remediable?

CASE XV.—Diagnosis, hereditary syphilis. A. S., eight years old, school child, born in the United States; admitted September 11th, and discharged October 16, 1922, improved. For two years she had had painful periostitis of the right shin and for a few months she had had similar symptoms in her right elbow joint. The skin over these regions had never broken down. The nose and teeth presented further proof of syphilis. Although the opposite leg was not painful it showed signs of syphilis also. The x ray pictures showed syphilis of bone distinctly. The Wassermann test of the blood was strongly positive and completed the evidence. Fortunately the child had no kidney disease due to her syphilis and no vaginal infection. While in the hospital she developed a peculiar cold. Tuberculosis was ruled out. Active syphilitic treatment was begun, her tolerance for the medicines and comprehensive methods of helping her were established for the staff of the clinic or of any other hospital. Plain duty was done when the older child was examined. It had no syphilis because the parents had not become diseased before it was born. Hence the second problem in this family case was answered and very happily answered. The mother was syphilitic as was proved both by the state of her blood now and by the fact of her syphilized child already detailed. The decision of family problems like these is high science and economics.

GONOCOCCAL INFECTIONS.

In sexual infection the discharge may have the gonococcus or an allied organism acquired sexually or accidentally and innocently. Its actual source may never be known. Of innocent patients the following three are examples:

Case XVI.—Diagnosis, gonococcal infection; abnormality of the hymen. A. C., twelve years old, school child, born in Austria; admitted August 12th, discharged September 9, 1922, improved. This child was respectable and never had had bad habits or companions. There was no possibility of intercourse because the hymen was not only not torn but also not normal and thick. No cause of the infection could be determined. The disease was true gonococcal invasion. She was kept under treatment until all symptoms abated, then discharged after instruction of the mother as to home treatment and regular dispensary care. When the tests indicated absence of disease the girl was allowed to return to school. The cure must be absolute before sexual maturity is reached. An operation was done correcting the child's sexual anatomy so that she is now normal. In having relieved the infection a service has been done, the value of which she will never realize. For example, she will never have infantile uterus or degeneration of the mucosa or disease of her tubes and ovaries, thus leading to sterility.

Case XVII.—Diagnosis, gonococcal infection following rape. E. C., eight years old, school child, born in the United States; admitted August 15th, discharged August 31, 1922, improved. The mother noticed a vaginal discharge for which she took the child for examination. Smears and cultures showed the gonococcus and suitable treatment was begun, first, to prevent other invasion, and, second, to cure the child. Neither father nor mother had any sexual affliction. A youth boarding with the family and sleeping in the room next to the child's had undoubtedly attempted congress with her. This youth was known to have gonococcal disease. He was arrested, and convicted.

Case XVIII.—Diagnosis, gonococcal subacute infection. J. P., four years old, born in the United States; admitted September 1st, discharged October 4, 1922, improved. This child's father is in the army, her mother is dead and her aunt is a professional nurse. With her father usually away and her aunt out on casework the little girl is at great disadvantage. No source of the infection could be ascertained. Female children acquire infection of the sexual organs with organisms of diarrhea and it is a sequel of scarlet fever, diphtheria, measles, typhoid fever, influenza, and almost any severe infectious disease. The child had had none of these, but was the victim of constipation and diarrhea. The aunt could not say whether the inflammation of the sexual organs began after diarrhea or not. It therefore was important to decide the type present. Perhaps as recently as five years ago the majority of physicians assumed gonococci to be present in any little girl having discharge from her vagina. One may not utter such an accusation now unless a smear and culture have proved the gonococcus to be present. The gonococcus was found. The source of the infection could not be ascertained. Regular treatment was given until examinations were negative. Although the service of the ward is basically diagnostic and preventive, continued treatment was pursued because the vocational conditions of both her father and her aunt prevented sufficient home care. Gonococci had disappeared by September 19th. Treatment was continued until October 2nd when she was discharged and thereafter followed up at the clinic and home. In this way precautions against relapse were taken. The importance of early cure lies in the fact that if the gonococcus penetrates the womb of immature girls its destructive results are certain to arrest development and sterility ensues.

Case XIX.—Diagnosis, gonococcal infection. A. D., fifteen months old, born in the United States; admitted September 26th, discharged October 24, 1922, improved. The baby manifested profuse discharge from the vagina about one month before admission. The cause could not be ascertained. She had been sent to a summer camp in perfect health and had returned with the discharge. Examination showed redness, swelling, tenderness and discharge. The gonococcus was in the smears taken and treatment was begun at once. Under this treatment the germs disappeared quickly. The tests on October 7th, 20th, and 23rd, were shown free of the gonococcus. The child was referred to the clinic for observation and cure of the secondary catarrh.

NONGONOCOCCAL INFECTIONS.

Potentialities for ill of infection of the urinary and sexual organs are great. It is essential that every discharge shall be settled as to its character. If it is nongonococcal it must be determined as to its innocuous or nocuous tendencies. These broad axioms need mere mention for the medical reader. Of the nongonococcal cases the following seven records are very instructive:

Case XX.—Diagnosis, pregnancy; nongonococcal vulvovaginitis. E. M. P., twenty years old, single, born in the United States, no occupation; admitted July 15, 1922, discharged July 24, 1922, improved. She became pregnant in January, 1922. She thought that the father of her baby had no venereal disease but about the second month of her pregnancy a discharge developed. Smears and culture showed no gonococci. This girl was treated until the diagnosis was settled and she understood how to care for herself, and was then referred to the prenatal clinic. Four all important things were accomplished. The woman and her mate were cleared of the suspicion of venereal disease. She was proved to be a safe inmate of a home and she was protected against infection in childbed and her baby was safeguarded against infection and destruction of its eyes. She was delivered on July 29, 1922, in St. Mark's Hospital and made a perfect recovery.

Case XXI.—Diagnosis, suspected gonococcal infection. F. E. and baby. The mother was seventeen years old, housewife, from Bohemia; admitted August 19th, discharged August 28, 1922, improved. A baby was born to this girl after a common law marriage with a young man who at first ran away but later returned to marry her. A discharge developed from the vagina such as is very common during the nursing period. Upon going to a hospital for examination and treatment the opinion was given (seemingly by a nurse or through a confusion of specimens) that she had true gonococcal infection. This news reached the young man who refused to marry her if this diagnosis were correct. With marriage as the proper solution of misalliance, this socalled diagnosis at once assumed grave importance. Smears and cultures on two different occasions were made. No gonococci were found and the girl was freed of suspicion. The laboratory report was confirmed by the facts that the disease had not extended to her tubes, ovaries and peritoneum and the eyes of the baby had not become infected.

CASE XXII.—Diagnosis, nongonococcal infection of the vagina and womb. E. G., twenty-two years old, married, housewife, born in the United States; admitted September 20th, discharged September 27, 1922, improved. There was venereal infection in the husband before his marriage but little evidence of it at the time of marriage. The fact that she had had two children at close intervals was prima facie evidence that she had not become infected. A profuse discharge suggested disease to the woman and she knew enough to be suspicious of her husband. Such facts lead to quarrels, disrupted homes, sometimes murder. The ward is for such patients and she was given intensive examination. The blood test was found negative and syphilis was ruled out. Smears and cultures showed no gonococci. The discharge was due to simple organisms which a little treatment would destroy. She was improved by a week of treatment, taught the treatment herself and discharged in care of the clinic. Her confidence in her husband was restored.

CASES XXIII and XXIV.—Diagnosis, suspected gonococcal vaginitis. M. G. and baby. The mother was twenty-seven years old, single, did housework, born in Ireland; the baby was a male, ten days old; admitted October 6th, discharged October 10, 1922, improved. This woman passed through a normal childbirth late in August, and remained well until she contracted influenza. With little disturbance of her health by the influenza, pain in the lower parts of her body began, followed by a profuse vaginal discharge. The nature of the discharge and the pain became grave. If the discharge was only a sequel of influenza, it might be relatively unimportant, although actively infectious. If the discharge was gonococcal, then in any nursing or other home her presence could not be tolerated. What concerns the woman in the latter condition would be the extension and damage to the uterus, tubes and ovaries with consequent unsexing. Examination of the child showed no infection of the eyes, genitals or bowel with the gonococcus or any other germ. Smears and cultures from the mother showed absence of gonococci and other important organisms. In the four days of her ward care she was taught how to protect her baby against infection and how to care for herself.

CASES XXV and XXVI.—Diagnosis, nonvenereal inflammation of the vagina. R. S., and infant son. Mother was twenty-four years old, single, servant, born in the United States; admitted October 11th, discharged October 26, 1922, improved. This mother had been at a home for some time since her delivery. A profuse discharge from her vagina and severe pain in her right side had appeared. The questions were concerned in the kind of infection, its relation to the pain and cause of the pain. Smears and cultures showed that she did not have gonococcal infection but that germs were present which often went with infected kidneys. Examination of the bladder with the cystoscope, and the taking of specimens separately from each kidney and an x ray examination showed her to have a small stone in one ureter near the bladder. This stone came away without operation and was lost by the patient. Meanwhile suitable measures improved her other sickness. The woman was discharged improved and free of all fear that she had acquired venereal disease, which had ascended into her tubes and ovaries and was causing her pain.

MISCELLANEOUS CASES.

Patients who belong to the urinary or sexual groups in a miscellaneous classification will apply for and be entitled to diagnostic and preventive investigation. Many are as important as the venereal cases and fully as difficult.

CASE XXVIII.—Diagnosis, hysterical retention of urine. J. C., seventeen years old, single, no occupation, a Pole; admitted July 27th, discharged August 21, 1922, improved. In another hospital appendectomy had been performed about five months before admission. During convalesence her urine was drawn. By hysteria the child acquired the notion that she could not urinate herself. For five months her mother had been drawing her urine three or four times a day. It became necessary to rule out hereditary syphilis as a cause of her nervous breakdown or any local infection of the sexual or urinary organs, both as the cause of the bladder difficulty or as the result of the use of the catheter. The actual condition of her nervous and mental systems was also important. Careful examinations for syphilis and for sexual infections were negative. The interior of the bladder was shown to have been irritated but not seriously damaged by the catheter. Her nervous system was found to be below high grade but not greatly defective. It was easy after these analyses to benefit the girl and to discharge her convinced that she could pass her urine naturally.

CASE XXIX.—Diagnosis, oversexual excitability; masturbation. F. D., four years old, born in the United States; admitted October 20th, discharged October 23, 1922, cured. This little girl had been detected in selfabuse. The future could hold only sexual temptations, then excesses, and finally degradation. A minor operation was done corresponding with circumcision in the male making the parts normal and no longer the cause of selfabuse. About two months after this girl was discharged, the nurse in charge of her at a home reported that all masturbation had disappeared.

This work has already extended sufficiently to indicate its need, scope and results, and also sufficiently to justify its development, endorsement and support. Within ten years every well organized community will insist on similar solution of its venereal disease, social problems and similar management of its citizens who are the factors in these problems.

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45 WEST NINTH STREET.

Synergistic Analgesia in Rectal Operations*

By J. F. SAPHIR, M.D.,
New York,

Consulting Proctologist, Manhattan State Hospital; Visiting Proctologist, People's Hospital, Home of the Daughters of Jacob, Home of the Sons and Daughters of Israel; Chief of Rectal Department, Stuyvesant Polyclinic.

General and local anesthesia of all kinds and varieties have been used in rectal operations, with a certain amount of comfort and safety to the patient and with a greater or lesser degree of success, depending upon the kind of case and the anesthetic that is used. General anesthesia in rectal surgery is the anesthetic of choice, except in those cases where it is contraindicated, as in renal, cardiac or pulmonary diseases, or in those cases where a general anesthetic is refused or where the case is one in which the operation can be successfully performed upon under local anesthesia. The great majority of rectal operations can be thoroughly and successfully performed under either local or general anesthesia.

The only excuse that I have to offer for advocating the use of synergistic analgesia in rectal operations is that there are a certain limited number of cases that crop up in the practice of every proctologist, where the patient's heart, lungs or kidneys will not permit the conscientious rectal surgeon undertaking an operation under the influence of a general anesthetic, and yet on account of such other conditions as an extensive ischiorectal abscess, with numerous discharging fistulæ, it would be inadvisable to use a local anesthetic, for fear of spreading the infection when injecting the solution, yet these patients require and demand immediate relief; or, where the patient has been bedridden as a result of some other systemic disease or illness, and a rectal condition develops that requires operative intervention, and the patient, or his relatives and friends, refuse to permit the use of any anesthetic local or general. In general surgery and in head surgery, these objections have in a great measure been overcome by the use of the high colon oil ether anesthesia. But in rectal cases this method has not been feasible, on account of the necessity of working in and about the anus and rectum. The reciprocal augmentation of the action of one drug by that of another constitutes synergism.

The late Dr. Meltzer, in reference to the synergistic action of magnesium sulphate, expressed himself as follows: "When after the administration of an amount of ether, insufficient to cause anesthesia, an inefficient amount of magnesium sulphate is injected intramuscularly, a profound anesthesia follows which can be maintained for several hours" (1). Meltzer was the first to introduce magnesium sulphate as an anesthetic agent, but he endeavored to produce the desired effect without morphine.

Dr. J. T. Gwathmey (2) reports experiments in conjunction with Dr. E. J. Pellini, to the effect that "a sufficient number of animal experiments had been conducted to prove that one eighth grain of morphine in two c. c. of a twenty-five per cent. solution of chemically pure and sterilized magnesium sulphate, given hypodermically and repeated twice at half hour intervals, anesthetized an animal sufficiently for the full force of an artery clamp to be placed anywhere on the skin without being noticed by the subject."

It is important that the chemically pure magnesium sulphate should be used. Meltzer (3) found: 1. The hypodermic injection is painless. 2. By using a twenty-five per cent. solution, complete anesthesia, including relaxation of all voluntary muscles, may be obtained with subsequent full recovery in animals. 3. The subcutaneous injection of magnesium sulphate does not produce immediate or late diarrhea, but the salts are eliminated by the kidneys. 4. No irritating influence was found among the effects of the use of these salts. The more concentrated the solution the more rapid the effect. The danger of anesthesia by magnesium sulphate comes only from respiration, but this can be completely reversed by the injection of a small quantity of calcium salts. The heart and pulse remain normal.

From these data it will be seen that magnesium sulphate is a safe agent to produce anesthesia but is not as valuable when used alone as when used with other agents. When used synergistically with other drugs, such as morphine, it is absolutely harmless and one of the most effective agents we know. With the use of three hypodermic injections, each containing an eighth of a grain of morphine and ten c. c. of a twenty-five per cent. chemically pure and sterilized magnesium sulphate solution, given at twenty-five minute intervals, the last injection given about half an hour before operation, the patient will be relieved from pain during the operation and be free from postoperative pain for twelve to twenty hours. In hypersensitive patients this method of analgesia may be supplemented with a little nitrous oxide and oxygen.

Gwathmey (4) reports that shock is absent, the patient is not in the third stage of anesthesia, there is no lowering of blood pressure, pain is absent for a longer time than when general or local anesthesia is used, usually for fifteen to thirty hours. The patients are comfortable, without nausea or vomiting, and the pulse and temperature are normal.

Magnesium sulphate has no deleterious effect on any of the tissues or organs of the body, and when used synergistically has no toxic effect whatever on the respiratory centre. It seems to act mechanically with morphine, holding the drug in contact with the tissues longer than when used alone, but with ether or gas and oxygen it acts by deepening or increasing the effect rather than prolonging it. An eighth of a grain of morphine in two c. c. of twenty-five per cent. solution of magnesium sulphate is increased in value fifty to one hundred per cent., compared with the same amount of morphine when used in sterile water.

One hypodermic of this mixture will relieve pain from ten to thirty hours, as compared with two to four hours with sterile water. When magnesium sulphate is used with ether, one third the quantity of ether is necessary; when used with nitrous oxide and oxygen, the oxygen may be increased and the nitrous oxide decreased. One hour and fifteen minutes before operation the first hypodermic of one eighth of a grain of morphine and ten c. c. of a twenty-five per cent. magnesium sulphate solution is injected and repeated at twenty-five minute intervals for three doses. If any idiosyncrasy is present it will manifest itself before the third dose is due. By the addition of magnesium sulphate to the preliminary morphine injection, better relaxation is obtained, and nausea and postoperative pain are much reduced if not entirely eliminated.

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Cushing (5) asserts that "the peripheral muscles and nerves are unaffected by morphine in any but overwhelming doses," yet when used with a twenty-five per cent. solution of magnesium sulphate the synergistic action of one upon the other holds in abeyance the extreme pain, operative and postoperative, even about the very sensitive anus and rectum.

The possible explanation of the increased action of morphine may be that the magnesium sulphate holds the morphine in contact with the nerve tissue longer than the morphine can retain that contact alone, and that the combined acion, or result of synergism is safer and at the same time more powerful than either of the drugs when used alone. The postoperative wound pain is eliminated, the patients are carried through the pain zone easily and comfortably, without any further administration of morphine. I have also noticed that postoperative catheterization was unnecessary, on account of the greater amount of relaxation produced by the use of synergism. The appetite is also better on account of the absence of gas and pain, which means a shorter convalescence.

Analgesia or the reciprocal augmentation of the action of one drug upon another is still slightly understood, but the results are greatly in its favor as compared with any other form of anesthesia.

Morphine and magnesium sulphate give relief from pain either immediately or at any other time for a much longer period of time than morphine alone.

CASE REPORTS.

Case I.—Mrs. E. B., aged fifty-four, was referred to me by Dr. I. Reissman, September 12, 1921. This was an extremely bad cardiac case, the patient suffering from myocarditis, endocarditis and pericarditis. She was in such a bad state that after she had alighted from the taxi and walked a distance of not more than ten or twelve paces into my office, she collapsed from the exertion and it took me about fifteen minutes to resuscitate her. She had a pale, waxy look, was very anémic, was gasping for breath, and wore an anxious expression as if suffering severe pain, and from great loss of blood. She gave a history of having had piles as long as she could remember, but had nothing done to relieve that condition. There were protrusions at every stool and some were out all the time. Severe bleeding accompanied every defecation. One week previously she noticed a swelling which became larger and more painful until about two days ago. After continuous application of heat, this swelling opened up in two or three places with a profuse discharge of pus and blood. She complained of severe and continuous pain, could not sit, stand, or walk without pain, and would not allow her bowels to move on account of the pain she anticipated. For the past three days she complained of difficulty in voiding, the pain being especially severe at the end of the act of micturition.

On examination I found a heavily built woman, weighing about 190 pounds, who had to be assisted on the table by two of her relatives. She was suffering from an ischiorectal abscess discharging a very foul smelling pus typical of a colon bacillus infection, from three fistulous openings—fissure, external and internal hemorrhoids, and a pedunculated polyp which got caught in the grasp of the sphincter muscle after each defecation. Her temperature was 104°, due to the infection.

I immediately had her admitted to the St. Mark's Hospital and ordered her prepared for operation the following morning. Her general condition and the state of her heart contraindicated the use of a general anesthetic, and her family physician advised against it, but he suggested the use of a local anesthetic. On account of the tissues being so much infiltrated with pus, I feared using a local anesthetic on account of the possibility of spreading the infection when using the needle for the injection of the local anesthetic. The operation, however, being imperative, I suggested the synergistic analgesia after the method of Dr. Gwathmey, but without the paraldehyde, and ordered three hypodermic injections of an eighth of a grain of morphine sulphate, in ten c. c. of a chemically pure solution of magnesium sulphate, twenty-five per cent., to be given at twenty-five minute intervals, the last injection to be given about twenty-five minutes before the operation. After the usual preoperative preparation and antiseptic precautions, the ischiorectal abscess was opened, the fistulous tracts laid open, the hemorrhoids were operated upon by the ligature operation, the pedunculated polyp was ligated and removed, and the sphincter muscle was incised to relieve the spasm produced by the fissure. The edges of the wound were then trimmed to prevent their turning in and to insure proper drainage of the very extensive wound, exactly as if the patient were under a general anesthetic. This was the only anesthetic used. The patient had no pain during the entire operation, was taken back to her bed and the following morning had a normal temperature. She was free from pain during and after the operation and did not require any postoperative morphine as is usual in other cases. She was discharged five days after the operation. Postoperative catheterization was not necessary in her case and she made an uneventful recovery, the wound healing entirely in a period of eight weeks. This case encouraged me in the use of synergistic analgesia in extreme cases where either local or general anesthesia is not feasible or is contraindicated.

Case II.—On December 26, 1921, Dr. M. Lubman referred to me Mr. S. R., aged forty-nine, a furrier by occupation, complaining of protrusions during defecation for the past twenty-five years, accompanied by blood and pain during as well as after stool, the protrusions requiring to be returned manually. The patient had been badly constipated for the past three weeks, but suffered no pain except during the time that the protrusions were outside, and this pain would be relieved when the protrusions were returned manually. He felt fairly comfortable about the rectum, outside of the discomfort and weakness following the passage of blood, until three days ago, when, after straining at stool, he noticed a huge mass protruding from the rectum, about the size of his fist, and which he could not return. This mass was hard and very painful and there was much continuous bleeding both from this mass and from the rectum. Examination revealed a very extensive mass of both external and internal thrombotic hemorrhoids, with areas of broken down tissue due to friction against the clothing and some gangrenous tissue due to the interference with the circulation of the parts. This man was much afraid of an anesthetic, so I decided to try again the synergistic analgesia as in the previous case. He was immediately sent into the St. Mark's Hospital, and was operated upon the following morning at 9 a. m., after having received three hypodermic injections each of one eighth grain of morphine sulphate in ten c. c. of a chemically pure solution of twenty-five per cent. magnesium sulphate, given at 7:45, 8:10, and at 8:35 a. m. I performed a complete hemorrhoidectomy, external and internal, using the ligature method, and although the patient was a bit frightened at what was going on, suffered no pain during or after the operation, did not require the usual postoperative dose of morphine, and had no interference with urination. He was out of bed the following day, and on the third day went home. He made an uneventful recovery.

Case III.—On December 17, 1921, Mr. J. F. called to see me with a history of having had an abscess about the anus seven years before, and was operated upon, being confined to bed for ten days. He had felt well until five months ago, when he noticed pain and swelling in the same region. He went to the same doctor who had sent him to the hospital for another operation, where he was laid up for two weeks, and one week later he required another operation on account of the formation of another abscess. Since then he had noticed a continuous flow of pus. Examination revealed a fistula with two tracts leading to an opening anteriorly between the external and internal sphincter. I advised operation, but the patient was so scared that he did not show up again until February 28, 1922, two and a half months later, during which time he had been under treatment by the same physician who had operated upon him previously. He then went to see Dr. L. Breinin, who referred him to me.

The patient told me that he had been laid up with a very bad case of influenza and bronchitis, and would not under any condition take any form of anesthesia. I decided to try again the synergistic analgesia. On March 1, 1922, after having received three injections each containing one eighth grain of morphine sulphate in ten c. c. of a chemically pure twenty-five per cent. magnesium sulphate solution, given at 8:45, 9:10, and at 9:35 a. m., he was operated upon at 10 o'clock. He was extremely nervous due to the fear of the previous operations he had undergone, but I laid the tracts open, dissected away all of the scar tissue, so as to encourage the formation of a flat, smooth scar rather than permit numerous hard linear scars, dissected away enough tissue to insure free and proper drainage, trimmed the edges of the wound, etc., the same as if he had been under a general anesthetic. He had no pain during or after operation, and left the hospital on the third day. He made an uneventful recovery.

Case IV.—On March 19, 1922, Mr. S. G. was referred to me by Dr. L. Bernstein. The patient, aged fifty-one, who had been working at umbrella handles, complained of blood and protrusions with every stool for the past twenty years. Those protrusions, he said, remained out for about half an hour to an hour before he could return them. He suffered from constipation and had been in the habit of taking cathartics for the past twenty years. He had been to a number of physicians, but refused any form of operation and obtained no relief. I sent him to the People's Hospital, where on March 21 he was given the injections as in the previous cases at 6:45, 7:10, and 7:35, and was to be operated upon at 8 a. m. He was so hypersensitive and so irritable that it was necessary to supplement the synergistic analgesia in his case with a local anesthetic, using one fifth per cent. of quinine and urea hydrochloride. A complete hemorrhoidectomy, ligature method, was performed, the patient evincing no signs of pain. He reacted differently from patients who are operated upon with the quinine and urea alone as a local anesthetic inasmuch as he did not require any postoperative dose of morphine.

Case V.—On March 23, 1922, Mr. S. B., furrier, aged forty-eight, came to me complaining of blood and protrusions with stool for the past eighteen or nineteen years. For the past three weeks he had felt worse than ever before, having noticed that the protrusions were out all the time, were much larger and more painful, but there was no blood. The pain was continuous, and more severe after stool. He purposely refrained from moving his bowels on account of the pain he anticipated. Examination revealed external and internal hemorrhoids, a fissure, and a blind internal fistula, due to an infection of the fissure. He had a typical furrier's chest, suffered from asthma and emphysema, and was a very poor risk for general anesthesia. On March 27, 1922, at St. Mark's Hospital, at 10 a. m., he was operated upon, after having received three successive injections of one eighth grain morphine in ten c. c. of a chemically pure solution of a twenty-five per cent. magnesium sulphate at 8:45, 9:10, and at 9:35 a. m. Although he was an exceedingly nervous patient, the sphincter muscle was cut to relieve the spasm for the fissure, the fistulous tract was opened, the edges trimmed for proper drainage, the external and internal hemorrhoids were removed by the ligature method, and a pedunculated polyp, which was not discovered at the time of the first examination, was ligated and removed. During and after the operation the patient did not complain of any pain and it was not necessary to give any postoperative sedative. The patient left the hospital after three days and made an uneventful recovery.

Case VI.—On March 20, 1922, Mr. A. D. was referred to me by Dr. J. Lempert. The patient was a printer, aged thirty-four years, and gave a history of having been operated upon at St. Bartholomew's and at the Polyclinic hospitals about thirteen years before for an abscess and fistula. He was laid up for a few days and had been feeling well after receiving treatments for a number of weeks, until four years ago when he noticed blood with every stool and also protrusions. He had been constipated for a very long time, and three days before he had a very large movement, since which time he had suffered from severe pain, especially after defecation.

Examination revealed ulcerated internal hemorrhoids and a fissure. I sent him to the St. Mark's Hospital where on the following day, at 2 p. m., after having received the injections as in the previous cases cited, at 12:45, 1:10, and 1:35 p. m., he was operated upon. But he was so extremely hypersensitive and nervous that it was impossible to even get near enough to him to find out whether any analgesia was produced, so it was necessary to supplement the synergism with nitrous oxide and oxygen to produce unconsciousness. The usual ligature operation for hemorrhoids and cutting of the sphincter for the fissure was performed and the patient suffered no postoperative pain requiring further sedatives, in spite of the fact that he was so hypersensitive.

CONCLUSIONS.

I do not wish to be misunderstood. I do not believe that synergistic analgesia can or ever will supersede general or local anesthesia for rectal operations, but in a few selected cases, such as those enumerated above, where a general anesthetic is contraindicated, or where, on account of an extensive suppurative process existing in or about the field for operation, endangering the spread of infection when a needle is used for producing local anesthesia, synergistic analgesia, as described, will frequently help the surgeon out of a dilemma. This may be supplemented with gas oxygen, if necessary, and will minimize the danger of a general anesthetic.

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345 WEST EIGHTY-EIGHTH STREET.

Advances in Röntgen Therapy with Special Reference to High Voltage Homogeneous Rays*

By WILLIAM H. DIEFFENBACH, M.D.,
New York,
Roentgenologist to Broad Street and Community Hospitals.

The subject of röntgen or x rays has been of great interest to me ever since their discovery and I have employed them clinically for over twenty-two years.

Since 1900, when various observers noted the action of the x rays upon the skin, with the production of dermatitis, alopecia and pigmentation, there have been waves of enthusiasm followed by depression as clinical results were confirmed or criticized and denied by members of the profession. With the usual conservatism of the profession, the general acceptance of x ray and radium therapy has been gradual but progressive, as results were demonstrated by the various pioneers.

When the limitations of röntgen and radium therapy are recognized, prognosis will be guarded in all but superficial malignancies and in circumscribed glandular lesions and skin diseases. It must be recognized that these vibrations in order to affect the tissues must permeate and penetrate them and the recent advances in deeply filtered x rays, producing radiations approximating the gamma rays of radium now furnish such an agency. With the three hundred thousand volt radiations we are still some distance from the million voltage of radium, but the goal may soon be reached. What we still lack in gamma rays quality we now have in augmented quantity and surface dispersion far superior to former doses.

It must always be borne in mind that these vibrations respond to Arndt's law and that small doses of x rays stimulate tissues and that deficient doses for inhibition of tissues are worse than useless. Inhibitive doses given with due regard to the condition of the patient and location of the lesion should always be applied in order to control malignant or benign growths. When a primary inhibitive dose cannot be applied at one sitting, the divided dose should be given within as close a period as the condition and reaction permits.

Attempts to achieve a dose destructive to cancer cells at one seance have been particularly cultivated in Germany where a number of clinical centres, Freiburg, Erfurt, Frankfurt, Breslau and Berlin, have announced specific doses for, respectively, carcinoma and sarcoma, the former at an increase of the erythema skin dose, the latter somewhat below it. The desire to achieve this "knockout" dose, while laudable, is fraught with much danger and cannot be accepted by those who have had years of experience with x ray therapy. The general adoption of this socalled cancer dose will be the cause of many deaths and tend to discredit röntgen therapy as a whole.

It must be remembered that it is the reaction of the sick individual to this powerful agent which determines the curative result and that age, complexion, nutrition and physical condition as a whole produces a variable result.

This powerful agency cannot be applied like a yardstick and the ionization measurement now recommended will fail as all other measurements failed as a standardization of dose. The human organism simply cannot be successfully controlled in this manner and many other elements besides the primary dose of x rays or radium radiations must be considered by the conscientious operator. An aged person, for instance, can stand a much larger skin dose than a child; a brunette more than a blonde; a negro or Chinaman more than a Caucasian.

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*Read before the Bergen County Medical Society, January 13, 1923.

The blood picture must be carefully considered for a hyperemic patient reacts differently from an anemic one. A patient suffering from bacterial or tissue toxemia can in no respect react like an individual in fair health. To attempt, therefore, to prescribe a massive knockout dose for malignancy is bound to be hazardous and fail in many instances.

The location of radiation also calls for much discretion. To attack an inoperable cancer of the breast or lung situated on the left side with massive doses involves cardiac changes which may be disastrous. In treatments about the liver or kidneys the same warning must be emphasized. The effects of the rays upon pituitary, thyroid, parathyroid, adrenals and gonads with resulting hormone deficiencies must be borne in mind. In treatment of the uterus, cystic or intestinal changes must be anticipated. It must also be remembered that the action of the x or radium rays are not entirely local but that all workers agree that the secondary radiations produced in tissues constitute an active factor in therapeutics. Thus we have noted on several occasions when raying a breast lesion, with the abdomen covered with lead screens, that amenorrhea was induced.

Following the bombardment of the tissues with the rays, a tissue toxemia, the socalled *röntgen-kater* or röntgen malaise is noted. This toxemia requires a number of days for its dissipation and is associated with nausea, nervousness and mental irritability and diminution of the alkaline reserve in many instances. We combat these symptoms with indicated remedies and have had particular satisfaction in prescribing the alkaline Kalak water six ounces every four hours given well diluted, continued for a number of days.

Following the suggestion of a French surgeon, Dr. Dubard, of Dijon (1), we have for the past four years given magnesium compounds to combat the stated tissue salt deficiency found in malignancy. We prefer to give milk of magnesia two to four drams night and morning for this purpose.

The elements of the new röntgen ray therapy with the production of homogeneous rays of deep penetration, as we employ them, are as follows:

1. Voltage controlled by sphere gap. The maximum crest at three hundred thousand volts.
2. Milliampereage: This is controlled by a double meter and carefully watched by an attendant. In order to preserve the life of the especially constructed Coolidge tube, the milliampereage is kept at four ma. throughout the treatment.
3. Spark gap: Maximum gap twenty inches; we employ sixteen to eighteen inches.
4. Distance of target to tissues averages twenty to twenty-eight inches.
5. Filtration: For the past five years we have used one sixth mm. of metallic silver with secondary filter of wood. This filtration furnishes the most satisfactory homogeneous rays we have thus far tested.
6. Time: Unless contraindications are present the primary inhibitive dose is forty minutes over one portal. Two or three portals are used at one seance in certain deep seated lesions or when crossfiring is employed.
7. Ionization measurements have not been employed, as the exact value and reliability of this technic is *sub judice*.
8. Repetition of dose: This requires experienced judgment. As a rule we do not repeat the raying of any lesion under two weeks and prefer to wait three weeks, except in emergent conditions where the necessity of controlling the lesion promptly is so great that the danger of severe toxemia is accepted as less harmful than the delay in treatment. Transfusion can be kept in mind if the toxic reaction to the rays is too severe.
9. Area to be rayed: The area should be larger than the visible or palpable lesion—the larger the better—in order to prevent recurrences from nonaffected outlying malignant cells. Viscera not intended to be rayed should be covered with the heaviest lead protection. Adjacent and distant lymphatics should be rayed after the original focus has been treated.
10. Secondary rays: It is now fully accepted that secondary rays are produced in the tissues following röntgen ray treatments and that these in turn produce constitutional effects. This can be easily studied in the blood picture. A few hours after treatment leucocytosis with special increase in the polymorphoneutrophiles is noted, to be followed by leucopenia. The lymphocytes are particularly reduced, the x rays and secondary rays having selective action upon glandular structures. Anemia is noted and hemoglobin reduced. Workers in radium mines have in a number of instances developed marked blood and splenic diseases.

The necessity of furnishing foods and medicines rich in mineral constituents in view of the fact that tissue salt deficiencies are usually found associated with malignancy seems indicated. Bearing in mind the reactive toxemia and inhibitive effects upon all viscera, the same care and attention as are given in cases of febrile and infectious diseases must be given after all massive radiations.

I have observed anuria—temporary—in cases where radiation was directed near the kidneys and arrhythmia has been of frequent occurrence. Gastric disturbances have been a usual accompaniment but these are as a rule charged to tissue toxemia. In a recent case Addison's disease appeared to complicate a malignancy treated some distance from the adrenals. Eliminating from this discussion the large class of diseases of the skin, we will confine ourselves to partially listing the malignancies where röntgen therapy has proved of value and where the new technic is especially useful.

SUPERFICIAL EPITHELIOMA.

It has been found that the basal cell epithelioma responds to filtered radiation in nearly all cases. A word of caution: in order to obviate peripheral recurrences—ray double the surface of the visible lesion. The prickle cell fungating epithelioma is often refractory and requires heavy primary doses. Small doses are likely to stimulate these lesions.

SARCOMA.

Lymphosarcoma and round cell sarcoma, if they are sufficiently rayed, respond in a good proportion of cases. Metastasis, however, is so insidious that, unless outlying and distant lymphatics are included in the treatments, one sector may be apparently inhibited only to find recurrences in another. These lesions must be kept under constant supervision for a successful issue. Melanosarcoma and mixed cell sarcoma respond less frequently than the kinds mentioned above and but few instances of osteosarcoma or chondrosarcoma have been reported cured.

ADENOCARCINOMA.

Adenocarcinoma requires heavier doses than sarcoma and a crossfire treatment with massive raying is usually employed. Papillary carcinoma can be inhibited but colloid cancers are more resistant.

MEDIASTINUM AND LUNGS.

Mediastinal tumors and pulmonary cancer, while inhibited in some cases, still present a large mortality. Improved technic has recently shown better results than in former years.

LIVER, STOMACH, PANCREAS, SPLEEN.

In malignancies of the liver, stomach, pancreas and spleen radiation has thus far been of only temporary benefit. Heavy doses, unless confined to only a portion of the viscus at a time, are likely to hasten *exitus lethalis*.

KIDNEY.

Kidney malignancies offer the same difficulties as the larger viscera. Extirpation of a sarcoma or hypernephroma, if followed by postoperative radiation, may produce inhibition of the function of the remaining organ and extreme care must be exercised in the doses to prevent kidney insufficiency.

INTESTINE.

In intestinal malignancies, after resection, postoperative raying has been beneficial. Where operation was contraindicated, radiation has prolonged life. In rectal lesions the local application of radium following which the deep rays were applied have apparently inhibited the malignancies in cases not too far advanced.

PELVIC TUMORS.

In fibroid tumors of the uterus intrauterine applications of radium plus the x ray are disputing the field with surgical extirpation. In cases of hemophilia, cardiorenal or other constitutional surgical contraindications these new measures are absolutely justifiable. In cervical malignancy radium plus deep x ray radiations has replaced the scalpel in many European clinics.

Preoperative and postoperative radiation is indicated where surgery is to be invoked in uterine or ovarian malignancies. In the clinics at Freiburg, surgery has been practically abandoned in pelvic malignancies and deep, crossfire x ray treatments substituted.

BLADDER.

In cancer of the bladder radium and deep therapy are receiving extensive trial in many bladder malignancies. We reported the first case of inoperable bladder malignancy apparently inhibited for four years in 1910 with a dose of 2200 m. gr. hours of radium, the latter being introduced through the exploratory incision.

PROSTATE.

In cancer of the prostate gland there are a number of lesions on record where after shelling out the tumor and postoperative radiation there have been no recurrences. The application of deep therapy via perineum and the use of radium needles offers a favorable attack on these lesions.

PENIS.

Cancer of the penis has been treated with high voltage rays successfully. Careful protection of the testicles is essential. Radiation of inguinal glands should be concomitant.

CANCER OF THE VULVA.

If this lesion is of the prickle cell variety it is often very resistant and must receive heavy doses and inguinal gland treatment.

MEATUS.

Caruncles or epitheliomata of the meatus respond to radium radiation in practically every instance.

The theories as to the action of the deep x or radium rays upon tissues can be explained as follows:

1. In massive doses these rays are inhibitive and destructive to cellular life as has often been demonstrated by the examination of rayed tissues removed from the living.

2. If the doses are not excessive and are not repeated too soon, reparative sclerosis follows the cellular disintegration in the attacked region.

3. Constitutional: Following the tissue destruction, tissue toxemia supervenes and if this toxemia is not excessive, the organism through the well recognized principles of immunity and autotherapeutic mechanism establishes resistance to the malignant invasion which prevails for a long period. We consider it prudent to administer moderate doses of x rays at intervals of one month, even after all evidences of malignancy have disappeared, in order to keep up this constitutional resistance.

CONCLUSIONS.

The claim can now be made that by means of röntgen ray and radium therapy, the former over large the latter over circumscribed surfaces, we can now control or inhibit cancer cell proliferation. This can be demonstrated daily in private practice and in clinics in lesions not too far advanced, to those who have an open mind on the subject.

In advanced lesions the combination of surgical removal plus x ray, preoperatively and postoperatively, prolongs life and sometimes cures.

In hopeless, inoperable lesions, temporary relief of symptoms and prolongation of life can be assured and in isolated cases apparent cures are achieved.

Our armamentarium has certainly been strengthened by the addition of the deep therapy technic and in a few years new paths will be blazed in the fight against malignancy.

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50 Central Park West.

A Case Report of a Cyst of the Epiglottis Presenting Some Unusual Features

By H. MARSHALL TAYLOR, M.D.,
Jacksonville, Florida.

In reviewing the literature on cysts of the epiglottis, one cannot but be surprised at the relatively few references to this subject in the American textbooks on laryngology, many of the authors making no mention of it whatever.

A comprehensive survey of the literature shows that the Europeans have been by far the more prolific writers on this condition, as evidenced by the fact that of the forty-two case reports of cysts of the epiglottis which were reviewed, thirty-three of them were by European authors. In recent years it seems that few statistics have been collected, and we are forced to judge of its relative frequency by the collections of the earlier European writers. As early as 1877 Beschorner collected 693 cases of laryngeal growths, of which forty-five were cysts. Fourteen of these were located on the epiglottis. In 1881 Moure collected sixty-eight cases of cysts of the larynx, of which twenty-three were located on the epiglottis. He states that cysts of the epiglottis occur less frequently than intralaryngeal cysts and that they are generally on the lingual surface. Purseigle states that of all tumors of the epiglottis up to 1905, forty per cent. were cysts.

Chiari, in his chapter on cysts of the larynx, says: "They owe their origin very infrequently to the mucous glands. In addition they arise from distended blood or lymph vessels as well as from serous effusions into connective spaces. Mucous cysts develop from the glands through retention after the closing of their openings as the result of inflammatory, ulcerative or cicatricial processes. Through this retention of the secretion the acini or tubules become distended, their walls become stretched and gradually eroded, so that ultimately a round sack develops which is lined within by a cuboidal, or a flattened pavement epithelium. The cyst is covered without by mucous membrane, which is at first red, but later becomes pale and translucent as the pressure becomes greater. Almost always one sees upon the surface single or branching bloodvessels."

If the forty-two case reports which were reviewed could be taken as a criterion, it would seem that age has little influence on the occurrence of this condition. The ages ranged from the newborn up to sixty-five years. As to sex in the forty-two case reports, these growths were found more frequently in the male than in the female in the proportion of two to one.

As to the location of the cyst in this review, they were found more frequently on the lingual surface of the epiglottis then on the laryngeal surface in the proportion of six to one.

The case herewith reported seems of particular interest on account of one condition. After a careful search in the literature I have been unable to find the description of a similar one.

Case.—The patient, L. H., male, aged twenty-seven, farmer, weight 118. His father died of tuberculosis at the age of sixty. The patient consulted me on January 10, 1921. The only complaint elicited by the patient was a description of severe, distressing choking sensations extending over a period of seventeen months. To quote him briefly, he stated that on August 10, 1919, he was suddenly awakened with a choking sensation. He felt that someone had their hands on his throat. On assuming an upright position the sensation subsided. On finding no one in his room he concluded he was dreaming. This experience was forgotten until a week later when he was again awakened by this same choking sensation. That night he was awakened three times by what he described as attacks. From that time until the date I saw him, these choking spells reappeared frequently and lasted longer, only occurring while in the reclining position or at times when taking violent exercise. He asserted that he never had any cyanosis, for by forcibly expiring or a slight cough the sensation would be overcome temporarily. There was no impairment of voice or difficulty in swallowing.

On my first examination, by depressing the tongue the cyst was easily seen. Laryngoscopic examination showed a round tumor one and a half cm. in diameter involving the lingual surface and right lateral border of the epiglottis, crowding the epiglottis posteriorly and to the left. The tumor was glistening and of grayish color, with a smooth surface traversed by several large bloodvessels. To the probe it was soft, elastic and insensitive to the touch. A diagnosis of a cyst of the epiglottis was made and operation advised. The patient refused operation and was lost sight of for approximately one year. On January 24, 1922, he again called on me in desperation, saying that he could stand his condition no longer. He stated that his choking spells had become so severe that he was afraid to go to sleep. On falling asleep he would wake up screaming and clutching at his throat, often finding himself at an open window gasping for air.

By direct examination the tumor was again observed, and the upper and right lateral border of the epiglottis could be seen to be markedly depressed posteriorly. On January 25, 1922, at St. Luke's Hospital, I suspended the patient. The tumor was grasped with fixation forceps and with curved scissors excised at its base. There was an immediate discharge of a yellow gelatinous fluid. The point of attachment was then cauterized.

Dr. A. C. Broders, of the Mayo Clinic, made the following report: The examination of the specimen of the epiglottis shows it to be a true cyst, or perhaps a better term would be cyst adenoma. While it is lined to some extent with squamous epithelium, there is also a good deal of columnar epithelium which undoubtedly secreted its contents. The rest of its wall is fibrous tissue with some inflammation.

Much to the disappointment of my patient, without speaking of my own chagrin, at the end of seven weeks there was no change or abatement in the severity or frequency of these severe spells of choking. Another direct laryngoscopy was made. There was no recurrence of the tumor and the closest examination failed to reveal its former attachment. However, the epiglottis was still turned on itself and occupied the same plane that it did prior to the removal of the cyst. In the reclining position the epiglottis could be seen to tilt further backwards and on forced inspiration was drawn downward toward the larynx. I could only account for this phenomenon on the theory that the prolonged pressure of the cyst had interfered with the resiliency of the epiglottis, which seemed to be more flabby and resembled somewhat the infantile type of epiglottis.

The picture of this atypical epiglottis combined with a group of symptoms in some respects resembling laryngeal stridor recalled to my mind the case report of Dr. Samuel Iglauer of an epiglottidectomy for the relief of laryngeal stridor.

On March 21, 1922, seven weeks after the removal of the cyst, during which time the patient was having these nocturnal attacks of choking, the epiglottis was exposed by the direct laryngoscope, and that portion showing a definite entropion was removed by the use of the alligator punch forceps. The amount of hemorrhage was trivial. The patient for five days following complained of some pain on deglutition, but otherwise was not inconvenienced.

Seven weeks after this procedure the patient states that he has not had any tendency toward his former paroxysms. His rest at night is unbroken and, furthermore, violent physical exertion can be taken without any inconvenience to his respiration.[1]

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[1] An excellent and complete biography will appear in the author's reprints. It was impossible to present it in the Journal due to lack of space.

Some Clinical Manifestations of the Anaphylactic Reaction*

By JOHN F. ANDERSON, M.D.,

New Brunswick, N. J.

I have chosen as the subject of my paper a discussion of some of the clinical manifestations of the anaphylactic reaction. At first this may seem to be largely a subject of theoretical interest and of but slight practical application; but such is not the case for some of the anaphylactic reactions have recently been shown to be of the greatest interest to the clinician. Before entering upon a discussion of some of the clinical forms of anaphylaxis, it would be well to review briefly the experimental basis of anaphylaxis and its development.

Anaphylaxis, also called hypersusceptibility, supersensitiveness, or allergy, is a condition of unusual or exaggerated susceptibility of the organism to foreign substances. The word anaphylaxis was introduced by Richet to describe a condition contrary to prophylaxis. As we now regard the phenomenon, the word is a misnomer, for we look upon the condition of hypersusceptibility as an important phase of certain kinds of immunity. In fact, protection against a large class of infections depends upon an altered power of reactions, i. e., hypersusceptibility or anaphylaxis.

This state may be congenital or acquired, and is specific in nature. The condition of anaphylaxis may be brought about by the introduction of any foreign protein into the body. Hypersusceptibility to proteins that are nonpoisonous in themselves may readily be induced in certain animals.

An animal may be in a condition of hypersusceptibility and immunity at the same time. The two conditions are closely interwoven; the latter is often dependent upon the former. Von Pirquet advises that the term immunity be limited to indicate the condition of complete resistance in which no clinical reaction occurs when poisons such as diphtheria, tetanus, and similar materials are introduced into the organism. He suggests the term allergy to indicate conditions of acquired immunity associated with anaphylaxis.

Allergy, then, as the word indicates, is an altered power of the organism to react. When this power of reaction is increased, we say that the body is hypersensitive or in a state of anaphylaxis.

It has long been known that the blood of certain animals is poisonous when transfused or injected into certain other species. But the blood serum of the horse apparently lacks such poisonous action. Large quantities of the blood serum of the horse may be injected into man, rabbits, guineapigs, and many other animals without serious inconvenience except occasionally a slight reaction at the site of inoculation.

It has been shown that ordinarily horse serum is a comparatively bland and harmless substance when injected into certain animals; but these animals may be rendered so susceptible that an injection of horse serum may produce death or severe symptoms. For example, large quantities of horse serum may be injected subcutaneously into the peritoneal cavity, into the brain, or directly into the circulation of a guineapig without apparently causing the animal the least inconvenience. If, however, a guineapig is injected with a small quantity, say 0.0004 c. c. of horse serum, and, after the expiration of a certain interval, again injected with horse serum, the result will probably be fatal. The first injection of horse serum has sensitized the animal in such a way as to render it very susceptible to a second injection of horse serum. The same phenomenon may be induced by the use of any other protein.

A certain time must elapse between the first and the second injection before the animal becomes susceptible to a second injection. This period of incubation is from seven to twelve days, and corresponds suggestively with the period of incubation of the serum disease which von Pirquet and Schick placed at eight to thirteen days.

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*Delivered before the Middlesex County, New Jersey Medical Society.

Guineapigs may be sensitized with exceedingly small quantities of horse serum. In much of the work quantities less than 0.004 c. c. were used, and it was found in one instance that 0.000,001 c. c. of horse serum was sufficient to render a guineapig susceptible to a second injection, and guineapigs may be sensitized with 0.000,000,05 of a gram of egg albumen freed from the other proteins of egg white.

It also requires very small quantities of horse serum when given in a second injection, to produce poisonous symptoms. One tenth of a cubic centimetre injected into the peritoneal cavity is sometimes sufficient to cause death; 0.1 c. c. subcutaneously may cause symptoms, while much smaller amounts given into the brain or directly into the circulation may be fatal.

The subject of anaphylaxis has been a fruitful subject of research in many laboratories for the past few years and an understanding of the experimental results has resulted in clearing up many previously not well understood clinical conditions. The most important manifestations of anaphylaxis from a clinical viewpoint are:

1. Serum sickness or the train of symptoms that may follow the injection of serum or antitoxin.
2. Idiosyncrasy to proteins, or as it is commonly spoken of—allergy.
3. The immune reaction to smallpox vaccine.
4. The tuberculin reaction.

SERUM SICKNESS.

All who have administered therapeutic serum have experienced occasionally a train of symptoms coming on after a period of from one to thirteen days following the injection, depending chiefly upon whether the person has previously received an injection of serum. As a rule, the symptoms following the injection of the serum have been mild and without danger, though sufficiently frequent and troublesome to call for much study and attempts to discover methods of prevention. A few cases are on record in which sudden death has followed a single injection of serum; but there are no reports in the literature, so far as I am aware, of fatalities following a second injection, although not infrequently such cases have shown alarming symptoms. A matter of much interest is the comparison between symptoms occurring in subjects after the first injection of serum and those following repeated injections. It has been shown that the symptoms following the second injection were not only more severe than those following the first, but developed after a very much shorter latent period.

In the first injection cases the symptoms usually appear in from eight to twelve days, while, after the second injection, this incubation period may be considerably shortened and the symptoms appear in from three to seven days—the local and general reaction being very much more marked than those following the first injection. This quickened reaction or response of the individual has been termed by von Pirquet and Schick the accelerated reaction and differs from the symptoms following the first injection only in occurring more quickly and being more severe. The second injection cases may show a train of symptoms sometimes coming on less than twenty-four hours after injection and characterized by marked local erythema and edema, sometimes by urticaria and constitutional disturbances.

The percentage of instances and variety of symptoms vary according to the reports of different observers. A rash of some form occurs in from seventy to eighty per cent. of all cases showing a reaction, joint pains occasionally accompanying the appearance of the rash and not infrequently there is an enlargement of the lymph glands, particularly those in the neighborhood of the injection. Albuminuria is common and fever usually present. Perhaps the symptoms of which the patient complains most bitterly are those attendant upon the rash, which produces a feeling of tightness of the skin, with marked pruritus, and on account of the involvement of the mucous membranes, particularly of the upper respiratory tract, there may be in some cases difficulty in breathing. Occasionally, on account of the involvement of the intestinal tract, there is diarrhea.

A matter of much practical importance in connection with serum sickness arises in connection with the administration of prophylactic doses of antitoxin. I am often asked whether it would be safe to give a patient who has previously received a dose of antitoxin another injection some months or years afterwards, and my reply has invariably been that while in my opinion it is probably safe as concerns the life of the individual, the patient and the family should be warned that the second injection is likely to be followed by a train of symptoms described as serum sickness. It is important to know that the injection of any kind of serum in persons who are subject to asthmatic attacks may be followed by alarming symptoms and even death. This class of persons in some way have become acutely sensitive to the protein of horse serum. These reactions to the serum protein are not the same as in serum sickness, but probably should be included under the type of cases discussed in the next heading. When the injection of horse serum, normal or antitoxic, is indicated in asthmatics, the physician should be careful to inform the patient or family of the possible serious aftereffects.

Another matter of importance is the prevention or treatment of the symptoms of serum sickness. It has been suggested by European workers that it would be advisable in the case of persons who have previously received an injection of serum to administer one tenth c. c. of serum followed an hour or two hours later by the full therapeutic dose, and this method has been used quite extensively in connection with the administration of antipneumococcic serum. For the treatment of the condition, after it has once developed, there is no real specific but relief of some of the symptoms may be had by the administration of adrenalin chloride, by sedatives, and by the use of bicarbonate of soda baths. The bowels of the patient should be kept freely open, and the patient kept on a liquid diet.

ALLERGY, POLLINOSIS OR PROTEIN SENSITIZATION.

When Anderson and Rosenau of the Hygienic Laboratory, in 1908, in their Harvey lecture, first suggested that some cases of idiosyncrasy to food might be due to a sensitization of the patient to those food products acquired in an unknown manner, and that this phenomenon might be regarded as a manifestation of anaphylaxis, it was thought that like true anaphylaxis, allergy was of such rare occurrence as to class it as a medical curiosity. It was so regarded until Schloss confirmed the sensitiveness of a patient to egg protein by means of the skin reaction and later succeeded in desensitizing him by repeated injections of pure egg protein. The origin of such sensitization in many cases is still unknown, but for purposes of study, they may be divided into two groups: inherited and acquired, the greater number falling into the first group.

Allergy which, in the beginning, was regarded as largely of theoretical interest, by reason of the large amount of study of the past few years, is now definitely established as an important factor in a variety of clinical conditions. Skin tests with allergens or pure proteins have been of the greatest assistance in the diagnosis and subsequent care of many cases of asthma, hay fever, and vasomotor disturbances of the upper air passages, eczema and other skin affections, angioneurotic edema and disturbances of the gastrointestinal tract. Many of the sufferers from these conditions give a positive skin test to more than one allergen or protein and consequently should be desensitized to each positively reacting protein.

Sensitiveness to proteins from food substances, epidermal products, pollens and bacteria may be readily demonstrated by the intradermal test or the cutaneous test with the preference, especially on account of its absolute safety, to the latter.

The test is simple and easily done. A satisfactory method is to bare the forearm and wash the inner surface where application is to be made. Use sterile water or physiological salt solution only. (Do not use alcohol, ether, or similar substances, which interfere with the delicacy of the reaction.)

Make a single scarification, not more than one eighth inch long, with a sterile needle or use an instrument such as the von Pirquet borer. Penetrate the outer layers of the skin only, care being taken not to draw the blood. Rub into the tissue at this spot the soluble protein, either in the form of the dry powder with a drop of sterile decinormal sodium hydrate or bicarbonate or as a ten per cent. dilution in sterile physiological saline or sodium bicarbonate solution. A series of scarifications and inoculations may be made at the same time.

When desired, a one twentieth to one per cent. solution of the allergen may be prepared, and injected intradermally with a tuberculin syringe and fine needle in doses of one hundredth to two hundredths cubic centimetre each. This is strictly an intracutaneous inoculation and must not be confused with a subcutaneous injection which, in cases of hypersensitiveness, is sometimes hazardous.

When either technic is employed, controls with the salt or alkali solution alone must be made by the same method for comparison.

If hypersensitiveness to a given protein exists, there will appear about the site of inoculation a distinct urticarial wheal, having a sharply defined but irregular border, within five minutes to half an hour, and often lasting for several hours.

After the diagnosis has been made of the offending protein specific treatment may be started in the endeavor to desensitize or render immune the patient to the offending protein or pollens. In food sensitization the omission of the food found as a cause or strongly suspected by reason of a positive skin reaction in many cases relieves the patient of his symptoms, although in some cases on account of the importance of the article in the dietary, it may not be possible to omit it from the diet.

In such cases and where there is sensitization due to pollens, bacteria or epidermal substances, the desensitization by subcutaneous injection should be attempted. The strength of the injections should always be controlled by the results of skin tests of the strength of solution to be injected. For example, if the patient gives a positive skin reaction to a one to 5,000 dilution, the first injection should be from a solution not stronger than one to 10,000.

The treatment in cases of pollinosis should be begun sufficiently in advance of the seasonal appearance of the offending pollen to have the patient in condition to resist the effect of the pollen.

If we vaccinate a person with potent vaccine virus who has never before been vaccinated, we obtain a reaction which begins on the third or fourth day by the formation of a papule which goes through the various stages of vesicle, pustule, and the final formation of a scab which, when removed, leaves the typical scar of a successful vaccination against smallpox.

This entire reaction occupies approximately three weeks. If, however, the individual has previously been successfully vaccinated or has had smallpox, the reaction will be accelerated in development, shortened in time, and decreased in severity. The papule will appear earlier, the vesicle will be smaller, the area will be less intensive, and the entire reaction may be complete any time between the fourth and eighth day. If the immunity of the individual is very high, acceleration of the reaction may be so great that it consists only of the papule and areola, reaching full development in twelve to sixty hours after vaccination. This accelerated reaction may be taken as evidence of immunity and is a true anaphylactic reaction.

It is of practical importance in demonstrating whether the individual who has previously been vaccinated still retains his immunity.

When tuberculin is injected into a normal individual in not excessive amounts no reaction follows the administration. If, however, tuberculin be injected into an individual suffering from tuberculosis, except in the very late stages of the disease, there is a response on the part of the individual to the products of the tubercle bacillus, as shown by the local reaction, fever, and increased activity of the tuberculous process. This reaction can be obtained in varying degree by the subcutaneous injection of the tuberculin, by intradermal administration, by means of inunctions containing tuberculin, or by instillation into the eye. They all indicate an increased susceptibility or state of anaphylaxis on the part of the individual to the products of the growth of the tubercle bacillus. They are important for diagnostic purposes and perhaps for the treatment of certain forms of tuberculosis, particularly localized and chronic types.

The Dawn of Surgery: Its Armamentarium

By JONATHAN WRIGHT, M.D.,
Pleasantville, N. Y.

The volume or volumes that might be written on the surgery of man would contain much to astonish those historians of medicine acquainted only with the timid attempts to relieve sufferings by surgery at the dawn of the historical period, and it would still further interest the modern surgeon by bringing to his notice, as hoary with antiquity, ideas of the technic of his art usually conceived to be of recent date. It would require a volume of no mean size to set forth this matter which really lies behind the low state of surgery we find in Hippocrates and even in Celsus, for we have no reason to suppose that what primitive men in a primitive environment do now was essentially different from what they did during the existence of the older civilizations. Making due allowance for the filtering of civilized arts through ever wilder zones of culture to those most remote from the modern or ancient centres, primitive surgery cannot have differed much at any time from that which existed when no centres of civilization can be said to have begun. Civilized tribes and arts may have retrogressed at all periods and what we see may sometimes really hail back not to the dawn of surgery but may have descended from the zenith of some forgotten civilization or from some lost offshoot of one with which we are familiar. If this is to be kept in mind it may also be well to remember that specific arts may have withered and become blighted in a civilization from special and exceptional causes, while even great advance has been registered in other fields. Such I believe was the case with surgery before Hippocrates. Unwise legislation, as I have before remarked, was evidently at the root of this, supported by religious intolerance encouraging a wizard "to whine a song over a sore that craved the knife."

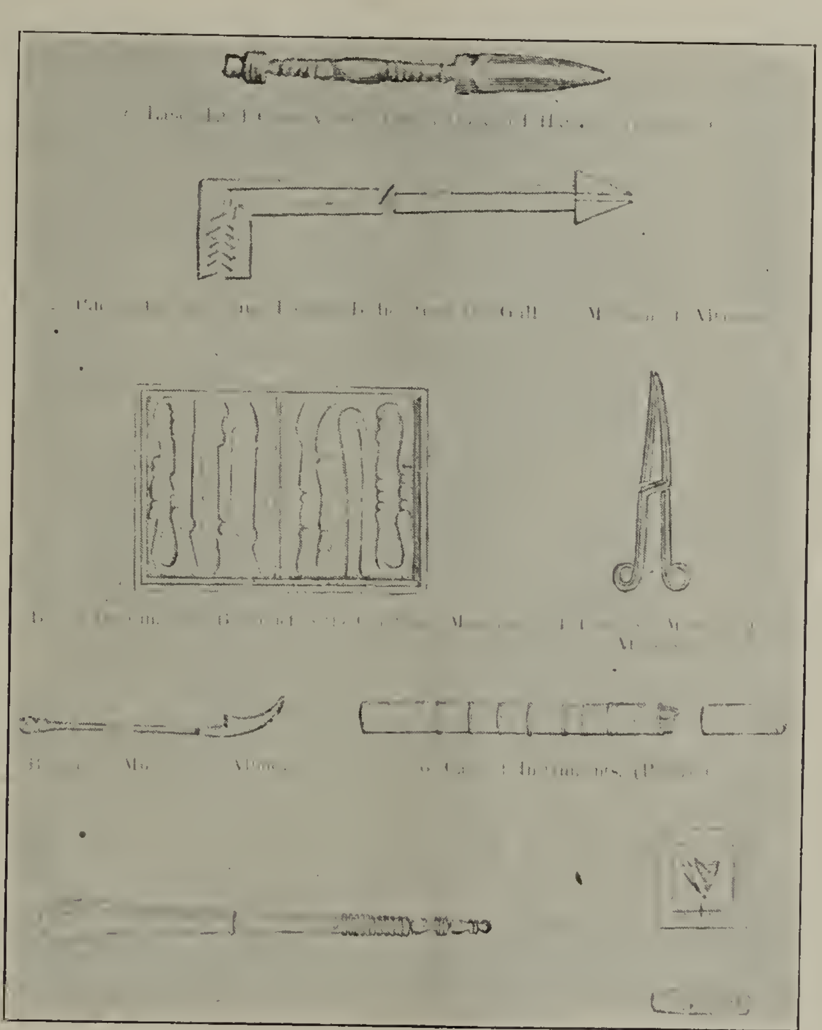
Fig. 1. Ancient Roman instruments from various places.

Where I have brought this into prominence we were busy with the splints and reduction apparatus of Hippocrates for dislocations and fractures (1), which more recent writers have pictured to themselves he must have used. As to the latter, modern surgery like primitive surgery gets along better without such formidable and complicated contrivance, but in Africa the Baganda (2) "fitted sticks along the broken bone after removing the flesh from it and bringing it into position; the splint was fitted along the bone and left there and the flesh was brought back to cover it. The wood used for this purpose was from the strychnine plant." Among the Melanesians (3) "they have an excellent method of treating a fracture of the tibia. They take about two and a half inches of the green sappy stalk of the tagete (Cordyline terminalis) and insert it about one and a half inches in the medullary canal in the upper part of the bone. They then violently extend the limb, bringing the orifice in the lower part of the bone opposite the projecting end of the stick"—in short, they make a dowel joint utilizing the medullary canals of the long bones. I will not stop to inquire what the results were. The Polynesians, however, as another observer (4) remarks, use splinters of bamboo cane, much as we did a few years ago, and are expert in the treatment of dislocations, the author reporting also, in all the innocence found in the Hippocratic Corpus and its commentators until within a century or so ago, what he supposed was a successful technic in reducing dislocations of the neck. Dobrizhoffer (5), too, in the eighteenth century, found Paraguayans skillful in the treatment of fractures. De Sahagun also saw the ancient Aztecs (6) reducing fractures and dislocations when the Spaniards arrived. The Sinaugolo (7) of British New Guinea pad with leaves the splints they bind on with long strips of the dried cortex of the banana. The Naga tribes of India (8) and the pagan races of Borneo (9) as well know the use of splints, and the Afghan doctors, it is said (10), use a plaster of the yolk (white?) of egg and flour, the germ of the plaster splint. Even among the Shoshone in America (11) they knew, before the white men taught them, how to splint a fracture with willow twigs. A more thorough perusal of the records of modern primitive man, of which this is but a glimpse of the fractures and dislocations, soon establishes a conviction that even in this field, where Hippocrates himself has written so much and so well, there must have been a retrogression from the practices of primitive men, for we see them making use of the armamentarium which Nature has furnished them with a skill and a boldness and a freshness of thought not to be found even in the best books of the Hippocratic Corpus. They, too, were chary of amputations, not because of established law, but because in fractures especially they as a rule believed in conservative surgery.

We should expect them skilled in the extraction of foreign bodies and they were. The extraction of arrow heads was probably the first difficult job the army surgeon of primitive man encountered. No other has more exercised the ingenuity of his descendants. The barbed head, even when the shaft remained attached, made it a problem and a very painful one. In New Guinea, the sloping spines of the arrow head severed from the shaft baffled a native operator under the observation of a modern witness (12). After tugging at it "he succeeded in getting a string around it, and bending over the top of a strong sapling he tied the other end of the string to that, and then releasing the tree it sprang up with great force. The patient let forth a yell of agony, but the arrow head was dangling at the end of the string. The wound left behind was a frightful one, but in the space of a short time the patient entirely recovered, although the arrow head had been deeply embedded in the shoulder and chest." When a leg or arm has a spear embedded in it the Samoans (13) push it through. Among the Fijis (14), more than a hundred years ago with a sharp piece of bamboo crossed incisions were made over an arrow head sticking in the chest of a native and carried down to the bony walls, the noose of a string was passed over the barbs and the head was pulled out with some of the lung substance clinging to it. A dressing of banana leaves and cocoanut oil was prepared. A pledget of it was rolled up and kept in the bottom of the wound, renewed with the dressing from time to time. Convalescence was prolonged for a twelve month, but the banana leaves and the oil and bamboo splinter and the seton worked all modern surgery could, on the average, expect and vastly more than modern surgery, before antisepsis, dared hope in such a case with vastly more evolved surgical supplies.

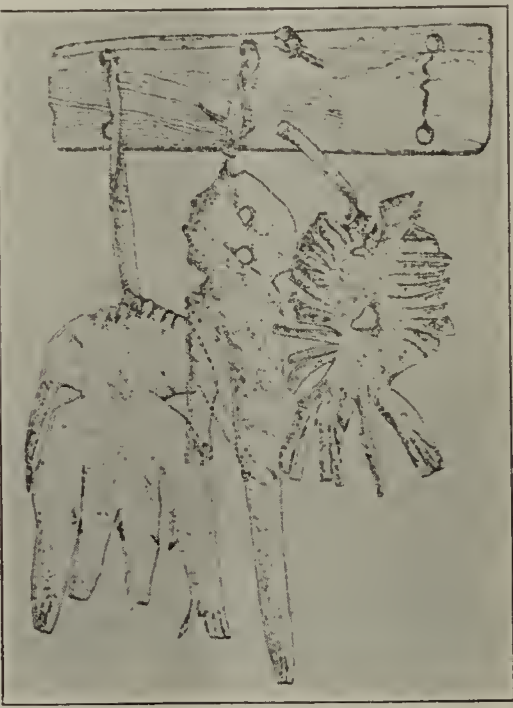
FIG. 2.—Shaman's ivory knife; length: twenty-seven cm.

In Uganda (15) they pierce the chest wall for pleurisy "until air escapes through it (sic). In a few days they appear to be quite well and simply dress the wound with butter." Sir Harry Johnston needs now no support for his statements, but as to cases where pleurisy among savages is treated successfully by paracentesis and the collapse of the lung, one may as well mention that Hobley (16) tells the same story for East Uganda. We are familiar with the stories of the recovery of the wild man from frightful injuries and desperate illnesses under surgical and medical treatment, but we see the suggestion in the sequence in which I have placed the above accounts that observation of wounds of the chest may have led the savage surgeon to advanced modern surgical treatment for medical disease.

With the subject of craniotomy there are connotations which are of the greatest interest outside strictly surgical lines. When a prehistoric man had a headache he concluded apparently, and from his point of view the conclusion was entirely logical, that a devil was inside his skull and that the proper thing to do was to have a hole made in it and let him out. There is much more to the story of the large number of skulls found in various parts of the world, exhibiting two or three or more perforations, often evidently the result of repeated operations. Peru has furnished a number of these skulls to many of the museums in many other cities both in this country and in foreign lands, but a great collection of them may be seen in New York in the American Museum of Natural History. Broca (17) and Lucas-Championnière (18) and the French have had opportunities of studying the operation in modern times among the Kabyles, one of the hill tribes of northern Africa, who practice it still. In prehistoric times it was apparently so widespread a practice as to take its place as a manifestation of an essential part, the demonology, of primitive thought. The transmission from demon etiology to the splendid word neuralgia is a natural one perhaps, but its connotation of thought with intracranial pressure is manifest. In the Loyalty Islands at Uvea it is said (19) the operation still prevails for neuralgia, dizziness and other cerebral affections. The ancients in the time of Hippocrates took no such chances of curing such things. Often, in tropical lands, a cocoanut shell is used as a prothesis to cover the hole in the skull. They also trephine the long bones for rheumatism. Among Polynesian savages (3), too, one finds them occasionally raising depressed bone in fractures of the skull, using as a knife and scraper a sharpened sea shell. Ninety per cent. of recoveries are claimed by one wondering observer from the lands of asepsis and the modern surgical supply companies.

Innumerable accidents by flood and field made primitive man fertile of resources and he sought in the nature about him an armamentarium ready made to his hand and he frequently found it so, but his ingenuity was also diligently set at work by the accidents of savage life. Various forms of the ritual of magic called for mutilations of the parts which partook of the nature of surgery or opened the door to it. The amputation of finger joints comes down to us from the cave man (20). We shall have to speak of circumcision as well as the surgery of parturition. Front teeth were not only broken off, but filed and filled and noses and lips pierced to enhance the beauty of women and the dignity of man and they all had their varying technic and the simple instruments with which to accomplish it.

We naturally know more about the instruments of prehistoric man than we do the purposes to which they were put, but many if not all of their uses have been revealed by the study of modern primitive men. In the stone age Lubbock (21) mentions many implements with which current literature has now made us more or less familiar. Some of these we have every reason to believe from what we know of modern primitive man were devoted to surgical purposes. From the above we have just had a hint that palaeology can have revealed only a modicum of the resources at his command In the Terramara settlements among the ancient Lake dwellers of Central Europe, but also elsewhere, notably among the Esquimaux in modern times, very delicate and minute tools have been preserved (22) which testify to his manual skill and this doubtless was exerted as well on the anatomy of man as upon the many objects of which daily use was made for utility or adornment. The kitchen middens ransacked by research in many parts of the world have emphasized the resourcefulness of early man. The wonderful flint knives from Egypt, to be seen in the New York Metropolitan Museum, are testimonials to the efficiency of the cutting edges of primitive tools. Some egyptologist, I remember, but whose record I will not try to find in my notes, in comparatively recent times has said that he once knew an old Egyptian fellah who habitually used a flint knife to shave with, not so handsome doubtless as those of six thousand years ago which lie in the museum cases, but efficient in his hands though perhaps somewhat painful. Yet it is in Egypt also we get the first glimpse of iron.

Nevertheless it was with iron that the Pelasgai from beyond the Black Sea, it is thought, carved their way even into Egypt around the Mediterranean land routes, bronze and iron swords in their hands and metal armor gear on their backs, which Elliott Smith (23) thinks the Egyptians gave to the world in the first place. Some go so far as to say (24) that not only was copper known eight thousand years B. C., but bronze manufactured as early as 4800 B. C. did not come into general use until three thousand years later, and iron was known four thousand years before its economic use. The stone age, palaeolithic and neolithic, the bronze age, the age of iron, are about as indefinite, vague and unscientific ways of dating time as could possibly be invented, on that account probably so extremely useful to palaeologists and so popular with their interpreters. They overlap one another to such a degree that one is safe in referring almost anything to any one of them. The old gentleman shaving with a flint knife in modern Egypt is an epitome of the criticism of this terminology. If the working of iron first began in Africa, as Schweinfurth (25) thinks, we may well imagine as we look at the stone images and temples of ancient Egypt in their ruins that there is found its first use in the arts of civilization. Sidereal iron and probably copper was known to much more primitive men, but was worshipped, not used, by them when they first began to invent, even in the earliest stone age, but when iron was first given a hard cutting edge, then only did it begin to count for civilization. That is the event it is hard to date and the rest of the chronology in the story of iron does not assume much significance in the history of ancient civilizations for surgery or any other of man's arts. It is, however, the subject of endless discussion by archeologists. As to this point and as to the similar one of glass they have cast history adrift.

Much more frequently than as a shaving implement do we find flint still in use for ritual purposes in sacrifice or in circumcision in modern times. This reverence for its efficiency pursued religion into the surgery of the medicine man. The shaman's knife was so used long after the white man brought the Indian something better for his surgery as well as for his warfare, but in America, for the latter at least, he had already begun to use the copper, but copper alone never anywhere ever completely displaced the stone cutting implement. Even bronze displaced it only partially, but when iron began to take an edge, I know not exactly when, then ended the first dawn of surgery and its approach to the zenith, as we with imperturbable vanity call our own epoch, began.

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Health Conditions in the New York City Prisons

By JAMES A. HAMILTON, Ph.D.,
Albany, N. Y.,
Secretary of State

Sanitation, personal hygiene, and general health, play an important rôle in the study, care and rehabilitation of the delinquent. A healthy mind goes hand in hand with a healthy body, and a physically normal inmate is more receptive to our correctional program than one who is lacking in bodily vigor or who is handicapped by disease or abnormalities.

The personnel consists of resident doctors and nurses supervised by John M. O'Connor, M. D., medical director, who is responsible to the Commissioner of Correction through a medical board composed of leading members in the different specialties of their profession, who outline the general policy. Harmonious cooperation between the medical bureau and the executive offices has been an important factor in producing the excellent results in the medical department.

SANITATION.

Eternal vigilance on the part of the sanitary officer in each of the department's institutions has enabled us to prevent epidemics of diseases, particularly insect and vermin borne. The old jail fever, which at times carried off the major part of the prison population, is heard of no more. Old buildings, formerly the source of disease and the nidus of pestilential epidemics, are clean and healthy. Daily rounds are made by the resident physician (the chief sanitary officer) who makes a careful inspection as to the quality and quantity of the food, its wholesomeness and its preparation.

Cleanliness of the inmates' cells, bedding and wearing apparel, is enforced. Personal cleanliness and good habits of the inmates are insisted upon. The recommendations of the chief sanitary officer to the warden take precedence over all orders. In addition visits are made from time to time by sanitary officers of the Department of Health. Vermin exterminators visit each institution and a general cleaning and sterilization of blankets and bedclothes is constantly conducted.

PERSONAL HYGIENE.

On arrival, inmates are compelled to take a shower before presenting themselves for medical examination and they must bathe thereafter at least once a week. There are resident dentists at each of the two general hospitals and visiting dentists for the outlying institutions that are not in direct contact with the island hospitals. Each inmate receives a thorough dental examination and whatever work of a temporary nature that is necessary is performed. Permanent mechanical dentistry is available for all those who desire it. Inmates have their own barber shop where all the sanitary laws of the Department of Health are complied with. Toilet articles and tooth brushes are available for all.

GENERAL HEALTH.

The department maintains on Welfare (Blackwell's) Island two general hospitals, one for men and one for women, with branches at both Riker's and Hart's Islands.

On admission, inmates are divested of their clothing and are taken before the doctor for a searching preliminary examination. They are then assigned to the quarantine quarters, unusual cases being referred to the visiting and consulting staff pending final disposition. After a brief quarantine, inmates are assigned to their respective wards, or, if apparently normal, are immediately sent to the custodial prisons for classification and study by the executive officer of the respective clearing houses.

HOSPITAL WARDS.

The venereal wards for male patients are located at the penitentiary, Welfare (Blackwell's) Island, where venereal diseases occurring in the male receive treatment. To these wards are sent incoming inmates when found to be diseased.

The latest methods of treatment are used for gonorrhea. This service is being equipped to take care of all phases of the work, including the surgery of the sequelæ and complications.

GONORRHEA IN THE FEMALE.

Women convicted of prostitution are examined by medical officers of the Department of Health for evidence of venereal disease. Those found diseased are divided into two classes and disposed of as follows: a. The youthful, who are taken to Kingston Avenue Hospital, Brooklyn, for treatment by the Board of Health. b. The older, or more hardened offender, is sentenced to the Department of Correction Hospital (Workhouse for Women), Welfare (Blackwell's) Island.

Due to the fact that it is often difficult, even in a flagrant clinical case of gonorrhea, to demonstrate the gonococcus in the vaginal or cervical discharge, laboratory findings in gonorrheal cases are disregarded. All prostitutes, then, sent to the Department of Correction are required to take treatment for gonorrhea for a minimum of thirty days. The average number of women under treatment for gonorrhea daily is 104, out of a total census of 330. While forty per cent. of the women convicted for all crimes need treatment for gonorrhea, but five per cent. approximately of the men have acute symptoms. Gonorrhea does not always produce pain and discomfort in the female and is resistant to treatment. Women often go through their daily duties, innocent of the fact that they have gonorrhea. Prostitutes may cohabit, ignorant of their having this disease. On the other hand, the male must needs take treatment to relieve a painful affection.

In 1920 the treatment for syphilis and gonorrhea was outlined in detail by a board made up of consulting physicians of the Departments of Health and Correction.

Essentially the treatment of syphilis consists of the administration of salvarsan and mercury over certain periods of time. It has been exceptionally successful in reclaiming a great many individuals who not only would have been lost to the State, but also would have served as the foci or infection for the spread of these very loathsome diseases. Two hundred and eleven females received treatment for syphilis. Five hundred and eight males were also treated for syphilis.

DRUG ADDICTION.

Riker's Island is the hospital for the treatment of drug addiction in males. Our wide experience in the handling of drug addicts and our painstaking study of these individuals have developed a welldefined and definite policy for their care. This plan hinges on our conception of the medical and economic status of a drug addict. All students of drug addiction are grouped into two schools: First, those who believe drug addiction a disease; and those who believe with us that it merely is a pernicious habit.

Custodial care is necessary, and the treatment must be undertaken in institutions who have real custodial powers. It is useless to consider the treatment of drug addiction unless you have complete control and supervision of the patient and it is best that they be treated in correctional institutions.

Riker's Island, therefore, is essentially a hospital. Custodial officers are present to enforce order and discipline and to carry out the policy of the treatment that is dictated by the medical board in cooperation with the warden. In 1921 the Municipal Farm, Riker's Island, received and treated 2,197 drug addicts.

TUBERCULOSIS.

All male tuberculous cases are sent to Hart's Island to the tuberculous hospital there. The female cases are retained at the Correction Hospital on Welfare Island. One hundred and ninety-five male tuberculous cases were admitted during the past year. Of these 105 were complicated by drug addiction. Only four out of the 195 died, which is a remarkable showing, especially when we consider that we care for tuberculosis patients in all stages and also when we realize the high percentage of tuberculous cases that must receive treatment for drug addiction before we can start restorative measures to counteract the lung conditions. One hundred and forty-five cases were discharged improved, the average gain in weight being fifteen pounds. In addition to the tuberculous ward at Hart's Island there are excellent wards for the treatment of general medical cases, and also minor surgery.

SURGERY.

It is in this department that our results have been really spectacular. All surgical cases, both male and female, have had a very happy result. The women especially have been given through surgery the opportunity to keep away from the use of narcotic drugs. By far the great majority of the female drug addicts that come to us have some pelvic pathological condition that might be a cause for their continuing the use of morphine or heroin. Those who have signified their willingness have been operated upon and we have been successful in every case. There have been no surgical deaths and no infections.

The following operations, among others, have been performed:

Hernia	61
Circumcisions	21
Mastoids	4
Appendix	12
Inguinal adenitis	4
Hydrocele	6
Epididymectomy	5
Phimosis	2
Tonsillectomy	17
Varicocele	5
Orchitis	4
Gastronenterostomy	2
Decompression for depressed fracture	1
Cholecystectomy	4
Hysterectomy	5
Salpingectomy	19
Suspension of uterus	2
Uterine polyp Bartholin glands excision	2

GENERAL MEDICINE.

The following are some of the more serious cases that have received attention in our hospital:

Alcoholism	32
Acute myocarditis	6
Pleurisy	4
Otitis media, acute	2
Peritonitis	2
Obstipation (from drug addiction)	2
Cystitis	6
Pyorrhea adnexal disease acute	10
Herpes zoster	2
Influenza	140
Bronchitis	14
Uterine hemorrhage	2
Pregnancy	5
Arthritis deformans	4
Miscarriage	1
Nephritis, acute	3

NEW HAMPTON FARMS.

Owing to its distance from the city, the reformatory at New Hampton maintains its own general hospital. How successfully it is operating is attested by the history of the following case:

On February 18, 1921, inmate known as R-7173 was transferred to the Reformatory and was received in a semiconscious state. He was immediately sent to the hospital. Upon arrival the resident physician found that the inmate already lapsed into unconsciousness. A diagnosis of sporadic cerebrospinal meningitis was made. Two other physicians were consulted and a lumbar puncture made, which confirmed the diagnosis. This inmate remained unconscious for three days. On the third day his speech returned but was not coherent. He was given nine injections of antimeningococcus serum and kept on improving until April 26th, when he was given a special invalid parole. The resident physician has since seen this inmate. He is normal in every way, showing no paralysis or any of the other sequelæ to this disease.

PSYCHIATRY.

Sixty-one patients were committed to Matteawan as insane misdemeanants. One was transferred to Dannamora as an insane felon. Seventeen patients were sent to the State Institution for Mental Defectives at Napanoch.

The data that we have received from mental examinations have determined us to develop further psychiatric investigations and to recommend a thorough mental examination whenever feasible before trial.

Editorial Articles

THE QUESTION OF BLOOD TRANSFUSION

Although blood transfusion has been practiced for almost three hundred years, it was only placed on a really scientific basis a few years ago. It is gratifying to national pride to know that during the past thirty years most of the contributors to the science of transfusion have come from this country. At the beginning of the present century Crile worked out in great detail direct transfusion, but this method was superseded by the exigencies of war conditions. It is worthy of notice that blood transfusion is one of the valuable medical and surgical procedures improved out of all knowledge during the war, and also one of the few thus improved applicable to civil practice. It is obvious that blood transfusion is called for frequently in the time of peace.

At a meeting of the Medical Society of London, held on November 27 last, a discussion was held on blood transfusion in civil practice. Mr. Geoffrey Keynes, who opened the discussion, pointed out that there were now two transfusion schools, first, those who held that plain whole blood should be used, and second, those who believed that blood containing an anticoagulant was efficient. He further pointed out that while the whole blood method was satisfactory in the hands of those who were accustomed to it, it was the use of an anticoagulant which popularized transfusion and made it a certain and easy process.

Among the indications for blood transfusions the first and greatest was severe hemorrhage and shock. Gastric ulcer, especially in young patients, was another type of case suitable for transfusion. Another group of cases was the preoperative cases, and the speaker emphasized the point that many cases which were a serious operative risk on account of previous debility, as in carcinoma, were rendered an ordinary risk by prior transfusion. Mr. Keyes then discussed postoperative transfusion, and went on to say that, generally speaking, the use of transfusion in Great Britain was restricted. It had made much greater strides in America.

The most difficult matter to decide was when transfusion should be done, and Dr. Alexander Fleming referred to the work done in the war by Bruce Robertson, of Canada, and Brock, on the volume of the blood in bad cases of hemorrhage in which the anemia was very severe. The total hemoglobin in the blood in these cases was seriously reduced. A good indication of this loss was derived from the blood pressure readings. When the hemoglobin was reduced below a certain stage, regeneration of the blood from the marrow did not take place, but if a transfusion was given and the hemoglobin content raised, the marrow again functioned. There is no doubt that blood transfusion in selected cases is a very valuable procedure, and may and does not infrequently save life. Of course, it has not been perfected as yet, but it has been greatly improved by reason of the lessons of the war, and in the future will be more used in civil practice than it is now.

CANCER IN DOMESTIC ANIMALS

There is no subject in pathology more interesting or deceiving than that of cancer, and the enormous amount of research work carried out by highly competent observers during the past twenty years has not advanced the solution of the problem to any marked extent. Each time that a conscientious observer exposes the results of his work, the clearest conclusion that one comes to, invariably, seems to be the objection that he puts forward to the results of his predecessors. The latest and most important contribution to the study of cancer, that due to Cadiot, does not escape this criticism.

It is common scientific knowledge that cancer in animals is identical with the same pathological process in man in its nature, localization and evolution. The first consideration is not denied by Cadiot, but on the other hand he mentions many peculiarities relating to the latter two. As to evolution, it is to be remarked that the gravity of neoplasms appears to be less in animals, as the process may last for many years—even cancer of the kidney—without giving rise to cachexia. On the other hand, malignant growths are unquestionably less common in animals than in man, and in spite of what has been said in this respect, there may be a relative immunity in some species which compensates for a greater sensibility to the process in others. Carnivorous and herbivorous animals are equally prone to manifest cancer.

It cannot be denied that the localization of cancer is a question of race. In dogs, cutaneous cancer is the most frequent, while it is rare in other animals. Cancer of the penis and præpuce is more often met with in the gelding than in oxen, and is never seen in stallions and bulls. Cats and bitches are subject to cancer of the breast, while other female animals are usually free from it.

If cancer of the digestive tract is considered comparison with the human species becomes particularly instructive. For example, there are three authentic cases of cancer of the esophagus in horses, and this neoplasm is, according to really conscientious statistics, twenty-five times less common in animals than in man. Gastric cancer, rare in all animals, is nevertheless met with in the horse with relative frequency, but is forty times rarer than in man. On the other hand, gastric cancer develops in dogs one hundred times less than in man.

Cancer of the rectum, tongue and lips is absolutely exceptional in animals, while uterine cancer is more particularly met with in cows, and is infinitely rare in carnivorous animals, proportionately about sixty times less often in the bitch than in woman.

These figures are much more demonstrative when they give the proportion between the animal species than when they aim at a comparison with human beings. In point of fact, cancer increases in animals—as in man—with advancing age, and the question arises as to what may be called the cancer age in animals? It is certain that many of them are killed before reaching it, either for meat or for other reasons, and Cadiot has taken this fact into consideration when discussing the frequency of cancer in the herbivorous and carnivorous. This would seem necessary to bear constantly in mind, and that it is susceptible of causing a certain general reserve when establishing comparisons between animals and man.

On the other hand, it is difficult not to accept Cadiot's conclusion that the nature of the animal's food has no influence over the greater or lesser frequency of malignant processes in them. The carnivorous, especially, are not especially exposed, and even the amount of flesh they consume certainly has no importance in this respect.

Cadiot maintains that irritation, be it digestive or external, does not explain the genesis of malignant growths in animals, and the proofs put forward by him are unquestionably convincing, but he refers to numerous irritating agents to explain the frequency of cancer of the penis in geldings, such as putrefied smegma and dust rich in bacteria.

It might be remarked that some biologists maintain that if irritative states apparently predispose to cancer the disease develops more frequently at points where this irritation—be it acute or chronic—has produced cicatrices which, on account of absence of blood supply and natural organic defense, appear to constitute the elective places for neoplastic development. And, although the data adduced by Cadiot seem to oppose to a certain extent the parasite theory of malignancy, neither do they agree with the many other explanations proposed for the genesis of these neoplasms. Especially can they not be invoked in favor of the dysembryoplastic theory, and in point of fact, why should there rather be a defective development of the tissues during embryonal life of the horse which later will be castrated, than in a horse that will remain a stallion?

It would seem more logical to publish data and endeavor to offer a positive explanation than to resort to negative ones in order to bring up objections to former theories, a condition of affairs that certainly obtains far too commonly among present day observers.

A SOCIAL SERVICE WARD AT ST. MARK'S HOSPITAL

Hospitals without bed facilities for venereal diseases are not doing their full public duty. Family manifestations of acquired and inherited syphilis are perhaps the most serious of the social disasters due to venereal diseases. Economically, anything less than the best and most intensive and persistent specific treatment places heavy burdens on the individual and later on the community. Whether we think of childless marriages, or of surgical emergencies and disabilities of women, the damages due to the gonococcus are serious alike to society and the infected person. Whether we deal with declared or unrecognized stages of either syphilis or gonorrhea, the expressions of both are so manifold that no hospital service lacks instances of them, whatever the specialty particularly served and whether children or women or men are accepted for care. It may well be considered that each case of venereal disease is the potential cause of an outbreak of the disease in the household or family, not always promptly, but quite likely to occur in the course of years or generations.

Social service has come to mean so much of human care and thoughtfulness that one balks at having the term applied to a ward used exclusively for venereal disease cases and suspects, as if venereal disease completely filled the content of the term medical social service. Would not the term family service ward be sufficiently distinctive and less of a plagiarism? But, by whatever name it may be called, its function is surely destined to be increasingly appreciated.

A ward such as that described in Dr. Pedersen's article, which appears on page 345, devoted to the sympathetic management and the scientific as well as social treatment of the lives blighted or threatened by venereal diseases, would be a boon to every hospital and dispensary, and contribute largely to the prevention of diseases of many kinds, mental and cardiac especially.

The spirit of the undertaking at St. Mark's Hospital and the policies formulated in regard to the relations between patients, their private physicians, and the families concerned, are admirable and may well serve as standards for similar wards which will doubtless be established with increasing frequency in the future.

As a resource of unusual value to the private physician; as a refuge for people across whose lives the disabilities of venereal disease have come by accident or abuse; as an assistance to the officer of health, the visiting nurse, the probation officer, the relief worker, this ward, combining as it does medical, diagnostic, and treatment service and social inquiry guidance and relief for this particularly urgent group of patients, will prove a boon of rare merit.

THE PREVENTION OF PHTHISIS AMONG PRINTERS

Dust and especially minute irritating kinds of dust excite into activity latent phthisis. Workers in trades in which dust is always present suffer greatly from respiratory affections and pulmonary tuberculosis in particular, and in proportion as the dust is small hard and irritating steel filings, so is the disease more prevalent. Dr. E. Halford Ross has been writing recently in the *London Times* on printers' phthisis and to enunciate the fact that silica-grit when breathed is the active factor in the causation of consumption. It is further maintained, and in keeping with this assertion, that the elimination of dust by constant cleanliness would bring about the prevention of this, the most prevalent disease among printers.

These letters gave rise to prolific and suggestive discussions. Dr. Ross has written in the *London Times*, January 26th last, relating the result of a practical test in this direction which he has made. The experiment was tried in the printing department of the Bank of England where, of course, phthisis had occurred. When the large building of the bank was nearing completion, some two years ago, it was suggested by the head of the printing department that a vacuum cleaning plant, with pipes carried to every floor, having a central exhaust engine with dust containers in the basement, might be a satisfactory means for keeping the new premises thoroughly clean. This was installed and has been used continually by a specially trained staff. Detailed medical notes and reports, from varying and independent sources, have been kept of all cases of sickness.

In order to make the experiment free from error similar records were also kept at another new factory near London which was engaged on similar work, but in which such cleaners had not been instituted. In neither of the works was there a picked population, but persons of all ages, including many newcomers, were employed. Two years of careful observation are therefore available. During the first year the new factory just referred to had five fresh cases, one of which has since proved fatal. It was then extracleaned and during the second year there were no cases of phthisis. But, and this is the point, the printing premises of the Bank of England, in the heart of London, have remained free from fresh disease throughout the two years. As Dr. Ross says, a remarkable result in a large staff engaged in a most phthisical trade.

The foregoing account affords a striking object lesson on the possibilities of preventive medicine. It is patent that if phthisis can be prevented in the printing trade, it can be prevented by similar or appropriate measures in several other trades. Dust not only excites to activity phthisis, but is a factor in the causation of many diseases and minor ailments and is the carrier of some hurtful germs, of how many we are ignorant. The elimination of dust in factories would be a long step on the road to a hygienic and sanitary ideal.

Good health is the most important individual possession and good health in the majority of a population of a country ensures national prosperity.

DEFICIENCIES OF DIET

It seems to be becoming more clearly understood by those who have made a special study of the subject that in diet rests chiefly the bodily salvation of the race, perhaps also to some extent the mental. Of course in considering this question many points must be taken into account. Climate is one aspect of the matter that is too often disregarded or its importance underestimated. In short, to a considerable extent, the kind and quantity of food taken must be adapted to the climate. In a tropical climate less protein, especially in the form of meat, is required, while in a very cold climate meat and fat must be eaten in large amounts in order to maintain the heat of the body.

But neither a very hot nor a very cold climate is conducive to the most vigorous health, or, at any rate, to long life, mainly for the reason that in a temperate clime a mixed diet can be easily procured and if taken in well balanced quantities is well assimilated and leads to good health and longevity. Further, the manner of life led must be taken into consideration and temperament and personal idiosyncrasies must not be neglected.

A great deal has been written and spoken recently as to what constitutes a wellbalanced diet, and in spite of numerous and painstaking investigations conclusions arrived at vary greatly. Within the past few years, in fact, since the discovery of those elements of the diet termed by Funk vitamines were discovered, their supreme importance has been constantly emphasized. At the present time, however, views in this direction have been somewhat revised, and the transcendental importance of vitamines is doubted. Most of the experiments undertaken to test the value of these elements have been made with rats, guineapigs, puppies, pigeons and so on, and are only partially comparable to human conditions. Some amazingly interesting practical experiments as to the significance of the presence of vitamines in the rations of farm stock have been carried on for some time at the Rowett Institute, near Aberdeen, Scotland. In the first report made for 1922, experiments are described which appear to show that it is more essential to seek for and supplement deficiencies in mineral constituents than to be oversolicitous concerning vitamines.

The conclusions based on farm stock, that is, civilized stock, bear a certain relationship to civilized man, so far as diet is concerned, and if these conclusions are confirmed will have a wide bearing. Broadly speaking, the results of experiments on young pigs showed that a vitamine deficiency had not so adverse an effect on health as a mineral deficiency. The addition of codliver oil had a definitely beneficial effect on health and rate of growth, but the effect was greatest when the diet was ill balanced or defective in its mineral constituents. It was found, moreover, that the beneficial effect of codliver oil was much greater in the case of sheep than of pigs.

Further studies were pursued dealing with the deficiency of minerals on young pigs, which deficiency produced a condition closely resembling that of rickets in children. On a ration consisting only of grains which contain an excess of magnesium, potassium and phosphorus and deficiency of calcium and sodium, a condition undistinguishable from that of rickets in children, both in symptoms and pathological effects, quickly arose. When codliver oil was given the general health of the animals improved and the onset of the symptoms was delayed, but the disease was not prevented. However, adjustment of the mineral contents of the ration enabled the animals to grow from the time of weaning to that of sexual maturity without any signs of rickets. In pigs, at any rate, the main factor in the production of rickets is the lack of the proper amount and balance of the mineral matter of the food. The beneficial effect of fat soluble vitamine A and sunlight is most marked where the mineral balance is defective.

The results of these experiments are very suggestive and tend to confirm the views of those authorities on diet who hold that a well balanced diet rather than one with its full quota of vitamine content makes for good health. Also they appear to demonstrate that a deficiency of the mineral salts is of greater consequence than a deficiency of the vitamine elements. Further experiments along this line will be followed with close attention as undoubtedly much of value is to be learned by researches on animals fed under civilized conditions.

THE DRUG HABIT

In Great Britain, at the present time, there is much discussion with regard to the increasing prevalence of the drug habit. Medical men are by no means exempt from criticism. It was reported in the lay press, according to a correspondent in the *Medical Press and Circular*, January 17th last, that an "eminent nerve specialist" had stated at a meeting of the Society for the Study of Inebriety, that out of every four British medical practitioners one was a habitual drug taker. As a matter of fact the speaker did not state of his own knowledge or experience that the sweeping indictment was true, but related it on the authority of Dr. Oscar Jennings in his book *The Morphia Habit and Its Voluntary Renunciation*, "that one medical man out of four is a drug habitué, usually a morphinist." It is to be hoped that this is an utter exaggeration, and there is no doubt that such is the case, but it is evidence of the increased prevalence of drug taking, or, at least, of the trend of public opinion.

As said before, in the lay press of Great Britain recently, the correspondence has been ample and profuse as to the widespread illegitimate use of harmful drugs, that is, harmful when not employed by medical men for the relief of pain, to induce sleep and so on. There is a suspicion amounting, in fact, to a certainty that certain drugs are used largely for purposes not legitimate. As Sir William Collins, a well known British physician, pointed out in the *London Times*, January 18, 1923, that in a report laid before the Assembly of the League of Nations in September last, it was justly observed that as long as dangerous drugs were produced in quantities exceeding the legitimate requirements, a great danger existed that the surplus would find its way into illegitimate channels. A control of production so as to limit it to the amount required for medical and legitimate purposes will, therefore, be the most effective way to put a stop to the illicit traffic.

This view was indorsed by the Assembly of the League. Sir William Collins, however, further pointed out that it had not been found easy to determine with accuracy and agreement what the legitimate requirements of these drugs were, 1, for the world's consumption, and, 2, to meet the demands of each particular nation. At the first Hague Conference in 1911, he made a small contribution to such knowledge by ascertaining that, at a particular London hospital treating some 138,000 patients annually, the consumption of opium in one year was less than thirteen pounds, and of morphine less than five ounces.

Recently it was ascertained that at ten large London hospitals, which treated more than seventy thousand inpatients and more than 550,000 outpatients in the year 1921, the amount of opium used in that year was less than forty-two pounds, of morphine less than five and a half pounds, and of cocaine a little over nine pounds. The writer went on to say that these relatively modest amounts of drugs included in the opium convention, which sufficed for the medical treatment of sick and injured persons, would tend to confirm the view that, of the hundreds of thousands of kilograms of opium raised, and of the tons of morphine manufactured and exported annually, there must be a large margin available for purposes which could only be described as illegitimate and pernicious.

With respect to cocaine, which is said to be largely used in Great Britain for purposes otherwise than medical, there appears to be no very valid reasons for its manufacture at all. The problem is international and can only be effectually solved by international action. If the abuse of drugs, which means drug addiction by a large number of persons, is to be prevented or even seriously checked, world wide drug control is essential. The question in this country, or rather perhaps in this State, has been for some time a vexed one. While it is allowed on all sides that the abuse of drugs is degrading and in a high degree injurious, it is also well understood that restrictions must not be enforced which will hamper the legitimate use of any drug by medical men. It appears that limiting the output of drugs such as opium, morphine, cocaine and heroine to legitimate requirements, or to as nearly an approach to these requirements as can be ascertained, is a sensible way out of the difficulty. It might not be amiss to pursue investigations as to legitimate requirements in New York and elsewhere in America.

ANNALS OF MEDICAL HISTORY

The Fall issue of the *Annals of Medical History* is a number of unusual interest. One of the principal and most timely features is the material on Pasteur. The cover bears the reproduction of one of the best known portraits of the great French scientist, and the frontispiece reproduces the famous picture of him at work in his laboratory. The leading editorial is an excellent résumé of his contributions to science and human welfare, and the book review section discusses his life by Descour. Among the special articles are the second instalment of Dr. Francis R. Packard's series, Guy Patin and the Medical Profession in Paris in the Seventeenth Century; Dr. George Dock writes on Robert Talbor, Madame de Sévigné, and the Introduction of Cinchona: an Episode Illustrating the Influence of Women in Medicine; Dr. Burton Chance discusses Some English Worthies of Interest to Ophthalmologists; Dr. Edward B. Krumbhaar contributes a very interesting article on the Early History of Anatomy in the United States; and Dr. Isador Coriat writes on Medical Magic and the taboos and primitive methods of treatment that have arisen from the conception of the physician as the possessor of supernatural powers. An editorial reproduces a page from the famous Edwin Smith Papyrus, an Egyptian manuscript written in the seventeenth century B. C., now in possession of the New York Historical Society, and gives an analysis of its contents. This document describes forty-eight cases, grouped in sections according to their anatomical classification. In addition to the valuable material contained within its covers, *Annals of Medical History* is of interest also because of the beautiful workmanship displayed. Rarely does a scientific work undertake to appeal also to the esthetic sense. The *Annals* is a triumph of the printer's art in illustrations, typographical work, paper, and general makeup.

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News Items.

German Congress for Internal Medicine.—The German Congress for Internal Medicine will be held from April 9 to 12, at Vienna, in the large reception hall of the Hofburg. The program for the Congress has already been arranged.

Bronx Pediatric Society.—The Bronx Pediatric Society meeting, on March 14, will be held at Daubert's, northeast corner Fordham road and Concourse. Dr. Lester J. Unger and Dr. Harry R. Litchfield will read the scientific papers of the evening.

Annual State Conference.—June 26, 27, and 28 have been selected by Dr. Hermann M. Biggs, State Commissioner of Health, as the dates for the Annual State Conference of Health Officers and Public Health Nurses. The Conference will be held at the Grand Union Hotel, Saratoga Springs.

Columbia Lecture Course.—The University Extension and the College of Physicians and Surgeons of Columbia University announce that registration for the course in Internal Medicine to be given by the staff of the Presbyterian Hospital, under the direction of Dr. Dana W. Atchley, will close June 1.

E. G. Janeway Lecture.—Under the auspices of the Mount Sinai Hospital, the E. G. Janeway lecture will be given by Professor J. J. MacLeod, of Toronto University, March 26, at 8:30 p. m., at the Blumenthal Auditorium, 1 East Ninety-ninth street, New York City, on "Experimental Work on Diabetes and Insulin." Physicians and their friends are cordially invited to attend the lecture.

Ninth Harvey Lecture.—The Harvey Society announces that John Howland, Professor of Pediatrics of Johns Hopkins University, will deliver the ninth lecture of the series on "Rickets" at the New York Academy of Medicine on Saturday evening, March 31, at 8:30.

The tenth lecture will be given on April 14 by Professor Otto Meyerhof, University of Kiel, Germany, on "Auto-Oxydation Processes in the Cell."

Civil Service Announcement.—The United States Civil Service Commission announces opportunities for appointment to persons who are qualified and who desire to enter the Government service at the new United States Veterans' Bureau Hospital for Colored Veterans, shortly to be opened at Tuskegee, Alabama, and erected on ground donated for the purpose by Tuskegee Normal and Industrial Institute.

Death Rate Increases.—The Department of Commerce announces that provisional figures compiled by the Bureau of the Census for the first nine months of 1922 indicate slightly higher death rates than for the corresponding nine months of 1921. For the States compared the death rate for the nine months was 11.7 in 1922, against 11.6 for the first nine months of 1921. The highest mortality rate for the nine months is shown for Maine (14.3), and the lowest for Idaho (7.8).

Fund for Pediatrics.—The College of Physicians and Surgeons of Columbia University has received from William Perry Watson, consulting medical director of the Prudential Insurance Company of America, a gift of $5,000 for the establishment of a permanent fund to be known as the Dr. William Perry Watson Foundation in Pediatrics. The annual income of this fund will be given in cash to the member of the graduating class showing the most valuable work in the study of the diseases of infants and children during a regular course at the college.

Scientific X Ray Heroes Win Carnegie Prizes.—The Carnegie Gold Medal was awarded to Professor Bergonie, of Bordeaux University. Professor Bergonie is a recent victim of x ray research, whose right arm and three fingers of the left hand were amputated.

Dr. Charles Vaillant, of La Riboisiere Hospital, who a short time ago underwent his thirteenth operation of amputation made necessary by the withering effects of x ray, and Professor Leray, another sufferer from the rays, will receive money grants from the Carnegie Foundation.

Site for New Hospital.—A syndicate of individuals interested in the work of St. Mark's Hospital has purchased the three five story tenements covering a plot seventy-five by one hundred in East Eleventh Street, opposite the Church of St. Mark's. The properties purchased by the syndicate are to be held in their present shape as an investment until St. Mark's Hospital can raise the necessary funds to erect a new building on this property for hospital purposes. Plans have been prepared but no improvement can be undertaken until the necessary funds, amounting to about $500,000, can be raised.

Fight Vivisection Bills.—Several physicians, including Dr. Simon L. Flexner, director of the Rockefeller Institute, declared at a hearing in the Senate chamber that the Coltillo-Leininger anti-vivisection bills were an unwarranted reflection on the medical profession in New York State. They asserted that it was ridiculous to think that unlawful experiments were ever made by doctors on children. Dr. William H. Parks, director of the laboratories of the Department of Health of the City of New York, declared experiments made by doctors in past years had greatly decreased diphtheria deaths in New York.

Grip and Pneumonia Gain.—The number of cases of sleeping sickness in New York have decreased, according to reports to the Board of Health, but there was an increase in pneumonia and influenza cases, due to the unfavorable weather conditions. The death rate for the week ending March 10th was lower than the week previous.

Typhus Plague in Russia.—Typhus as a great epidemic in Russia has passed, according to reports from Samara and Odessa received by the American Relief Administration. These cities are typical of their particular area, and though the reports are probably incomplete, they nevertheless give evidence of a great diminution in the disease. At Samara sixty-eight cases of typhus were reported in February and only one in March. At Odessa 2,506 cases were reported in February and only seven in March.

Academy of Medicine Needs.—The Academy of Medicine announced that it would try in the next few months to raise $250,000 from its Fellows and their friends to carry out the Academy's part of an arrangement with the Rockefeller Foundation and the Carnegie Corporation to construct and equip the $1,000,000 Academy Building, at Park avenue and Sixtieth street.

Both the Rockefeller Foundation and the Carnegie Corporation have agreed to contribute funds for the library and other educational utilities. One-quarter of a million dollars is needed to complete the purchase and to provide adequately for the operation of the new building.

Bequest for Fight Against Tuberculosis.—Announcement was made a few days ago, when the will of the late Dr. Karl Von Ruck, tuberculosis specialist, who died in Asheville, N. C., on November 5th last, was offered for probate, that he had bequeathed approximately $700,000 for scientific research into the prevention and cure of tuberculosis. The Von Ruck Research Laboratory, Incorporated, was created several years ago by Dr. Von Ruck, and will act as administrators of the fund, the earnings of which are to be expended "by the corporation or trustees for scientific research, study and experiment in tuberculosis and for the aid of tubercular patients who are unable to procure adequate and satisfactory treatment."

Hospital to Help Disabled Workers.—The appointment of Dr. Joseph A. Blake as surgeon in chief of the Reconstruction Hospital, 100th Street and Central Park West, is coincident with the decision of the trustees to proceed with extensive plans for the development of the hospital. The plans, including a new wing, to cost $1,500,000, already under construction, contemplate its development into one of the finest postoperative institutions in the United States. Electrotherapy, mechanotherapy, hydrotherapy and other methods of treatment especially designed to restore the functions of victims of industrial accidents or occupational diseases have been worked out with a remarkable degree of success at the Reconstruction Hospital. Even greater progress in the development and application of new methods of treatment are expected under the leadership of Dr. Blake, who worked out new methods of treating fractures used widely by the Allies during the World War. Dr. Charlton Wallace recently resigned as surgeon in charge of the Reconstruction Hospital.

Book Reviews

INTERNAL MEDICINE

Technik der wichtigsten Eingriffe in der Behandlung innerer Krankheiten. Ein Leitfaden für Studierende und Arzte. Von Dr. H. Stursberg, Bonn. Zweite, vermehrte und überarbeitete Auflage. Mit 49 Abbildungen im Text. Bonn: A. Marcus & E. Weber's Verlag, 1923. Pp. xii-176.

This is the second revised edition of a brochure dealing with the most important procedure in the treatment of internal diseases. Its publication was prompted by the author's experience in his association with students and young practitioners and also in his lectures on therapeutic technic and the practical procedures used. Most of the good larger works on the subject are not suitable for the student and the physician who has occasion to apply these procedures only rarely and who must acquire the technical details quickly in order to remember them; such books, furthermore, give a wealth of information, compelling the reader to select what he prefers, or they omit the necessary details entirely. This little book deals only with certain selected procedures that are simple, but sufficient and generally applicable. It goes into the most minute detail of every procedure mentioned, such as aspiration and injections, the local treatment of the esophagus and stomach, intestinal irrigations and injections and the use of the catheter and the local treatment of the bladder.

POSTOPERATIVE THERAPY

Therapeutique Postoperatoire. Par W. Rochard. Paris: Gaston Doin, 1922. Pp. 689.

This is a very well written and compiled book of about seven hundred pages. Its scope is quite broad, as it is intended for surgeons, general practitioners, and nurses. The first part of the book is taken up with general postoperative therapy, the various postoperative complications being discussed, while the latter part takes up the surgery of the various systems. In a consideration of the treatment following the various types of operations, the authors first discuss the normal postoperative therapy for each type of operation and then give in detail the treatment for practically all the postoperative calamities that might occur. This, of necessity, means that there is a good deal of repetition, but it is a great convenience if one desires to look up any specific type of operation.

There is a delightful thoroughness to the book and a decided effort shown to make the patient as comfortable as possible. In many places there is a distinct variance in therapy to our American ideas. For instance, in the treatment of shock, they advocate the use of stimulants such as camphor and caffeine and other drugs but no great emphasis is laid on the use of morphine. It is evident that the technic of transfusions has been more specialized in this country, for in their discussion of transfusions the authors give practically only two methods: first, the citrate method, and secondly, direct sutures of vessels. Very little mention is made or importance attached to either the syringe method, as popularized by Linderman, or the cannular method of Unger and Bernheim.

The reviewer is rather astonished to see no mention made of the treatment of high jejunostomy as a relief for paralytic ileus, an operation which has proved a real life saver in many cases if used early. The authors suggest cecostomy, but this has proved to be much inferior to high jejunostomy. Certain methods of treatment that they suggest are little used in this country. For instance, they advocate the injection of electrargol and gold colloidal solutions for the treatment of septicemia.

On the whole, the reviewer thoroughly recommends this book. It is written in a delightful style and is valuable for reference if one encounters some unusual postoperative complications.

NATURE OF NEGROID BODIES

Uber die Entstehung der Negrischen Körperchen. Von Dr. Ladislaus Benedek and Dr. Franz Oskar Porsche. Abhandlungen aus der Neurologie Psychiatrie, Psychologie und ihren Grenzgebieten. No. 14. Berlin: S. Karger, 1921. Pp. 86, 10 plates.

This study presents a detailed investigation of the nature and possible origin of the negroid bodies. The discussion proceeds with a presentation of the history of such study since the discovery of these bodies by Negri in 1903. With these findings and theories of other investigators the authors interweave their own material with which they confirm or question these opinions or with which they open the subject still more widely for future investigation. They explain their own special staining methods and the advantages which these possess. Their work is well illustrated in the ten plates found at the end of the book. Their conclusions tend to the view that these bodies are not parasitic in nature as some have believed but seem rather to be products of vital cell activity presenting a resistance to the invading toxin of rabies.

PSYCHOPATHOLOGY

Der anethische Symptomenkomplex. Eine Studie zur Psychopathologie der Handlung. By Dr. Othmar Albrecht, Privatdozent at the University of Vienna. Abhandlungen aus der Neurologie, Psychiatrie, Psychologie und ihren Grenzgebieten. Beihefte zur Bonatsschrift fur Psychiatrie und Neurologie. Edited by K. Bonhoeffer. No. 12. Berlin: S. Karger, 1921. Pp. 108.

Albrecht presents a stimulating and practical study of action in its intrinsic nature and makes this the basis of a study of pathological "anethical" action. His view is a sympathetically interpretative one of such action as the most natural expression of the ego situated in the midst of certain pathological factors and striving for its own advantageous assertion or reservation of itself. This latter he makes the explanation of the commonly observed negativism. The larger pathological complex may be evident as a distinct disease entity or it may reveal itself only after more careful search into the personality. In any case it demands individualistic research and therapy organic and psychic. One could only ask that the writer had followed up these individualistic features still more interpretatively in the psychic realm. The stimulus of his work, however, leads the reader into the way of such a task.

PSYCHOANALYSIS

Psychoanalysis. By R. H. Hingley, B.A., New York: Dodd, Mead and Company, 1922. Pp. vii-190.

This is a study of psychoanalysis written with thoughtful understanding of the subject by one who knows psychology in the older technical sense of the word. Therefore, he knows the place that psychoanalysis comes to fill as a form of psychology in closer touch with life. He has examined the deviations of thought within the fold of psychoanalysis itself. He presents these in a spirit of fairness with desire to find the working truth and to present the broad active function of psychoanalytical principles applied to practice. His treatment is such as to further knowledge and personal inquiry in regard to psychoanalysis. If he sometimes raises points of criticism which seem to exist only in his own interpretation, that is perhaps the inevitable limitation in any individual criticism. Presented as these are here they should only kindle independent investigation.

CHILD PSYCHOLOGY

Die Liebe des Kindes und ihre Fehlentwicklungen. Ein Buch fur Eltern und Berufserzieher. By Dr. Oskar Pfister, Pfarrer in Zürich. Bern: Ernst Bircher, 1922. Pp. xii, 375.

Pfister always writes interestingly and brings forward a fund of stimulating knowledge and experience. He has done all this here in his culling from the thought of prophet, priest, philosopher and educator their estimate of love and its place in life, particularly in the education of young life. Then he adds his testimony out of his own educational work where he has utilized psychoanalysis and developed its applicability in his particular field of work. He shows by illustrative cases the truth of the theories he advocates that love is the active force in child life both as it lies in its more sexual form at the root of life and as it affords all the capacity for higher developments. The misunderstanding of this love life, the binding of it through inhibitions instead of the training of it through sympathetic instruction concerning it, constitute the basis of disturbances in the child's development. Love must be freed and it must be cultivated through a recognition of its dynamic nature and capacity. The book is so arranged that it is easy to consult briefly but is also rich in content for more complete study.

POPULAR PSYCHOLOGY

Your Inner Self. By Louis E. Bisch, A.B., M.D., Ph.D., Garden City, New York: Doubleday, Page and Company, 1922. Pp. xxi, 195.

This brief presentation of the facts of the mental life, its mechanism and the material which makes use of these mechanisms, is clear and forceful. The brevity of its statements sacrifices nothing of accuracy or clearness of knowledge. Instead the author rouses the reader's interest to seek through personal investigation and personal practice freer use of his mental forces. The book is a very practical revelation of psychoanalysis and the matter which it reveals. The writer speaks from conviction of the important service of psychoanalysis but he has presented the subject in his own specially effective, popular manner.

PSYCHOLOGY

Nerves and Personal Power. Some Principles of Psychology as Applied to Conduct and Health. By D. Macdougall King, M.B. New York, Chicago, London and Edinburgh: Fleming H. Revell Company, 1922.

The author speaks, as in his former book, of a system of philosophy and applied psychology which he himself has put into practice. This book is the message of a man who faced oncoming death without losing his joyous appreciation of life. He discusses in simple understandable terms the bodily organism particularly in its nervous system and its function in the handling of energy for the satisfaction of the organism. He recognizes the fundamental positive values which are the incentives to action and the place which the "moral self" occupies in control of these. His definition of this as his consideration of the instincts, which follows Macdougall, lacks something of deeper interpretation of the force of hidden desire and the need for more analytical search for this. Understanding and control of a disturbed personality is not always so simple as he would seem to say. Yet he does not deny such deeper needs although they are too meagerly mentioned. His point of view is that of the wholesome control of the personality to its best ends through its desires, theoretically a sound viewpoint, practically, as he puts it, full of guidance and stimulus to his readers.

MIDWIFERY

The Threshold of Motherhood. A Handbook for the Pregnant Woman. By R. Douglas Howat, L.R.C.P. (Edin.), L.R.C.S. (Edin), L.R.F.P.S. (Glas.). Glasgow: Kaclehose, Jackson and Company. Pp. 49.

This is an extremely useful little book in which a large amount of valuable information concerning the antenatal and immediate postnatal care of the mother is compressed into forty-nine pages. The book is intended to provide instruction for the pregnant woman herself, and the language and wording are in keeping with this purpose, being expressive, concise, and clear. Technical terms are almost wholly tabooed. The subject is considered from all essential points of view. Sexual physiology is surveyed briefly. An obstetrical table is given by means of which an approximately accurate calculation may be made by the pregnant woman of the date of her confinement. The care of pregnancy is dealt with at some length. The individual symptoms of pregnancy are discussed. The layette and other necessities are described as well as the preparations for the confinement. The confinement itself, the symptoms of its onset, and the technic of delivery in so far as it concerns the woman are entered into and the chapter ends with an earnest advocacy of chloroform anesthesia during the period of labor. The last chapter discusses the measures to be taken with mother and infant just after delivery. The book supplies a need felt among the indigent and cosmopolitan inhabitants of New York and other American cities, as much as anywhere in the socalled civilized world. As the author says, the whole subject of midwifery may be summed up in two words; cleanliness and common sense; and these should be the watchwords of every expectant mother. This small volume is an epitome of midwifery from the woman's outlook and may be commended as such.

HUMAN AND BOVINE TUBERCULOSIS

L'Infection Bacillaire et la Tuberculose Chez l'Homme et Chez les Animaux. Processus d'infection et de defense étude biologique et experimentale. Par A. Calmette. Deuxieme edition. Paris: Masson et Cie., Editeurs, 1922.

Not since the great volume of Prof. I. Straus of Paris, entitled *La Tuberculose et son Bacille,* which appeared in 1895, has there come out a publication of such a character as the work of Prof. Calmette. The book deals with all the phases of the biology of the bacillus, the damage it causes in the animal system, and the natural phases of defense; nearly 650 pages are devoted to these subjects. In the introduction to this remarkable book Calmette pays a graceful tribute to Bayle, to Laennec, to Villemin, and to Robert Koch, and reproduces very good portraits of the three latter. As an American one feels slighted because Theobald Smith, who first distinguished between the bovine and human types of the bacilli, is not placed in this galaxy of pioneers in the study of the biology of the tubercle bacillus. Aside from this omission, one could hardly express anything but the highest praise of this wonderful work.

The book is divided into four parts. The first portion of the volume deals with the bacillary infection and the tuberculous process and in it are given the minutest details of the morphology, the method of finding, coloring, and differentiating the bacillus. A whole chapter is devoted to the isolation and culture of the germ, then follows a description of the influence which physical and chemical agents exert on the bacillus. In the fourth chapter are enumerated the chemical constituents of the bacillus, and then comes what may be considered one of the most complete and important contributions we have on the toxins of the tubercle bacillus (exotoxins and endotoxins and tuberculins). Calmette mentions no less than twenty different products derived from Koch's original tuberculin, among them the three which bear the name Koch, that is T. B., B. E., and A. F., the latter being the one without albumen. Then follow Klebs', Maragliano's, etc., and of course also the neurine tuberculin of Much and the P. T. O. (bovine) of Spengler.

In the remaining chapters of the first portion of the book the author has devoted considerable space to the evolution of the tubercle, its localization, how the virus of the bacillus penetrates through skin and mucous membrane, particularly how the infection is caused in the respiratory organs, glands, and intestines. The pathology of the acute, miliary, and chronic types, and tuberculosis in the aged are given careful consideration. The description of the latter type is particularly interesting. The author very justly says that chronic tuberculosis in the aged is by no means as rare as formerly thought. Its difficult recognition resides in the fact that in the aged the process is insidious and afebrile, and asthmatic and emphysematous symptoms hide the signs of tuberculous lesions; and yet many of these cases take on a very rapid course. Tuberculosis of the pleura, of the meninges, liver, spleen, and suprarenals is described. A special chapter is devoted to lupus, one to bone tuberculosis, and one also to bacillary transmission.

The second portion of the book deals with experimental tuberculosis in animals and gives a description of bovine tuberculosis, its frequency and geographical distribution, and all that is known up to date concerning the communicability of bovine tuberculosis through milk and meat. The third portion of the book contains admirable chapters on how the animal organism defends itself against infection, and on the diagnosis of tuberculosis with the aid of tuberculin. The reactions from tuberculin, such as are obtained by the various skin injections, intradermal, etc., are described. Calmette includes of course his own ophthalmoreaction, and it is somewhat surprising that he still adheres to this now universally abandoned method which was in vogue some years ago, commonly known as Wolff-Eisner-Calmette reaction. He maintains that if one is sure that the condition of the eye is normal, no possible harm can be done and that it is of greatest service in discovering family tuberculosis and thus preventing further development by timely treatment. The lengthy description of the tuberculous antibodies and the rôle they play in the defense of the organism against infection is most interesting. It is impossible in this review to discuss the various opinions of other authors quoted relating to the subject of serum and antibodies in tuberculosis. The student must read carefully all that this able author has written on the subject. It is gratifying that he mentions the admirable work done at the Trudeau Laboratory at Saranac Lake by Kinghorn. Twitchell, Lawrason Brown and Petroff, with which all American students of tuberculosis are familiar.

The fourth and last portion of the book gives a complete review of our present knowledge of natural immunity and the immunization against infection from tuberculosis. One chapter in this portion of the book deserves particular mention, inasmuch as it deals with the chemotherapy in tuberculosis, and it will repay the student to read carefully the results obtained by the use of the salts of calcium, gold, silver, bismuth, arsenic and iodide compounds, salts of thorium and the bromide and sulphate of radium. Thus far it seems that the experiments have been inconclusive and with the rarer salts not encouraging. With the various coloring matters the experimenters have thus far also met with unsatisfactory results, but as the author very well says, this should not be a reason for discouraging further research. Concerning the oil of chaulmoogra, the author admits the encouraging results in the treatment of lepra, but in the treatment of tuberculosis he seems to agree with the opinion of the American experimenters, Biesenthal, Kolmer, Davis and Jaguer, who reported unfavorable results from the use of this oil.

In the concluding paragraph of this highly interesting volume, Calmette summarizes the scientific principles which ought to serve as the basis of the prophylaxis of tuberculosis, and finally says: "The tuberculous infection is so widespread and in certain places so intense that one does not dare to hope for its limitation and subsequent extinction except by vaccination of all men and animals subject to tuberculosis (tuberculisable). This vaccination can be realized because it takes place spontaneously in a number of individuals as the result of one or several light infections and most frequently in the early life. It would be certainly dangerous to produce artificially such infections with the aid of virulent bacilli but we have seen that it is possible to modify certain qualities of the bacilli in such a way that they were no longer able to produce such cellular alterations, characteristic of the tubercle. It is for the experimenter to continue his researches in this direction."

No student who wishes to know the true status of our present knowledge of tuberculosis and its bacillus should fail to study thoroughly this monumental treatise by Calmette. The book is admirably illustrated. It has no less than twenty-five very carefully colored illustrations and thirty-one figures in black. As are all the books published by Masson & Co., so is this work well printed on good paper and solidly bound.

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Medicoliterary Notes.

An old book has recently been found in Paris, written by Astruc, consulting physician to Louis XV, in which he states that in 1726 a "charlatan" named Boile "asserts that all diseases are caused by small animals enclosed in the blood," and that each disease is due to different ones of these "animals," that there are other like animals that destroy them, and that there are certain remedies containing these helpful animals so that many diseases can be healed by this "very safe, very brief and very efficient method." Boile, it is reported, fled from Paris upon being accused of charlatanry, for the trial for this offense usually included frightful torture of the accused. Astruc's book sneers at and makes all manner of fun of this crude prophecy of bacteriology, and congratulates medical science upon Boile's disappearance, and that it has been "restored to its former laws."—*New York Times.*

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David M. Neuberger has in a recent issue of the *Outlook* a significant article entitled A Quarter of the Nation's Food Supply in Peril. Pollution of northern waters, both sea and river, by oil, tar, oil sludge and bilge, it is stated, has resulted in destroying or driving away almost all the valuable fish that formerly were so abundant in these regions, especially New England and the North Central States.

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Another study of mankind has just been added to the several published within the last few years. Scribner's has recently brought out as the first of a series of scientific works by leading American authorities a volume by Roland B. Dixon, professor of anthropology at Harvard University, entitled *The Racial History of Mankind.*

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In the *New Republic* for February 14th is an interesting and timely article by Nicholas and Lillian Kopeloff, of the New York State Psychiatric Institute, on The X Ray: Its Use and Abuse.

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The University of Chicago Press has recently announced the publication of a book entitled *The Antiquity of Disease,* by Roy L. Moody.

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The American Red Cross is supervising the transcribing into braille for the blind the Education of Henry Adams. When the volume is completed, it will be sent to the Library of Congress, whence it will be sent anywhere in the United States where it is wished for use by the blind and returned, free of postage. Ex-service men will be granted the privilege of reading it first.

* * *

The work of the Red Cross, through its Health Service in the New York County Chapter, for undernourished children in Manhattan, is outlined in an attractive pamphlet issued from chapter headquarters, 598 Madison Avenue, New York. George R. Bedinger, director of the health service, is the author of the pamphlet. He reports the successful operation of four child health stations and six public school dental hygiene clinics; 1282 children were enrolled in nutrition classes; and more than twenty thousand children were given dental hygiene treatment and instruction.

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Dr. H. Crichton Miller of London has in *Mental Hygiene* for January an article of unusual interest on Psychoanalysis and the School. Doctor Miller prefers to use in the text of his article the term analytical psychology instead of psychoanalysis, and considers its greatest educational contribution is to be made in the field of discipline.

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Public Health Reports for January 12th has for its leading article a report by Surgeon Talliaferro Clark, and Edgar Sydenstricker and Selwyn D. Collins, statisticians of the U. S. Public Health Service, on the much disputed question of Weight and Height as an Index of Nutrition. Another article of interest on this same subject may be found in the *Reports* for November 10, 1922, on Nutrition and School Advancement among Pupils in a Typical Community, by E. Blanche Sterling, acting assistant surgeon.

* * *

During the past few years an interesting experiment in the education of weak and crippled children has been tried out in Vienna, Austria. Large numbers of children were found to be unable to attend school regularly, so all these were collected in a special school to the number of about seven hundred, and were taught occupations suitable to their condition. After care was also provided through regular inspection of homes by trained nurses, and records kept of physical and social conditions to which the child is subjected so that these may be known to the authorities and help rendered when necessary.

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New Publications Received.

THE PSYCHOLOGY OF MISCONDUCT, VICE, AND CRIME. By BERNARD HOLLANDER, M.D. New York: The Macmillan Company, 1923.

GRUNDRIS UND ATLAS DER ALLGEMEINEN CHIRURGIE. Von PROF. DR. GEORG MARWEDEL. Munchen: J. F. Lehmanns Verlag, 1923.

MEDICAL AXIOMS, APHORISMS AND CLINICAL MEMORANDA. By J. A. LINDSAY, M.A., M.D., F.R.C.P. London: H. K. Lewis & Co., 1923.

EXPERIMENTAL PHYSIOLOGY. By SIR EDWARD SHARPEY-SCHAFER. Third Edition. New York and London: Longmans Green & Co., 1921.

VORLESUNGEN ZUR EINFUHRUNG IN DIE PSYCHOANALYSE. By VON PROF. DR. SIGM. FREUD. Leipzig: Internationaler Psychoanalytischer Verlag, 1923.

Practical Therapeutics

THE TREATMENT OF LOCAL INFECTION BY PHYSICAL MEASURES*

By William Benham Snow, M. D.,

New York.

> "The actual harm resulting from the infection must, to a large extent, depend upon the degree of adaptation to the new condition of life possible on the part, both of the invader and the host."

This truism stated by Zinsser (1) gives the rational clue to the success or failure of the therapeutics of infection, for if the invader finds the field unsuitable from an existing immunity in the host, his existence or growth will either cease or diminish. Or, following invasion, if an antibody is injected which changes the field into one unsuited, harm will be limited or removed for the host. If by other means the body's defences—the phagocytes—in increasing numbers can be induced to assail the infection, the harm will be diminished or cease.

The employment of vaccines so to affect the condition of the host that the invader is destroyed or rendered harmless, has rendered most valuable service in some of the most serious constitutional infections, notably smallpox, diphtheria, cerebrospinal meningitis, tetanus, and typhoid fever, with the number increasing under scientific research.

The physical status of the host as to resistance, idiosyncrasy, or other conditions will vary in different individuals and in the same individual under varying conditions. The condition of the host, therefore, is the unknown quantity in the therapeutics of infection, as it concerns vaccine therapy, particularly in relation to the treatment of pyogenic bacteria. Often brilliant success will follow the use even of a stock vaccine; whereas, very often the employment of most carefully prepared autogenous vaccine will be a complete failure. So often are these results unsatisfactory that intimate friends among the bacteriologists give unfavorable opinions as to the value of vaccines in the treatment of localized infections.

With the use of the physical measures, particularly the forms of radiant energy, it is possible to fortify the resistance and augment the defenses of the host against the invader. Concerning local infections the success of these measures is so uniform as to be relied upon. They actually destroy the invader with the measure employed, afford or induce a greater activity of the phagocytes, or lower the resistance of the invaders, when the phagocytes overwhelm them.

Practical experience during twenty years of investigation has given convincing evidence that local infections succumb more uniformly when subjected to the physical agencies to be described than to vaccines. Local septic infection, which is recognized as serious by physicians and surgeons, has lost most of its terrors to many of the profession who are familiar with the use of radiant light and heat, dry hot air, and other measures in the management of such cases. It is a source of regret that their intelligent employment is not generally understood by the profession.

During the last three decades the clinical employment of the ultraviolet rays, first by Neils Finsen in the treatment of lupus, awakened an interest in the therapeutics of the sun's rays and the electric arc in the treatment of infection. Subsequently the value of the x ray and other forms of radiant energy, including the use of the incandescent lamps and dry hot air were demonstrated. More recently the established value of the ultraviolet rays, as produced in the quartz mercury vapor lamps as a means of destroying germs, was recognized, and later the high frequency currents have made possible the practical treatment of a large variety of infectious conditions.

There are three distinct ways in which germs may be destroyed, 1, by the direct action of an agent which will destroy them *in situ;* 2, by raising the local tissue resistance with the induction of a greater activity and greater numbers of leucocytes or lymphocytes in the field of infection, and 3, by sterilization and inhibition of the activity of the bacteria. These effects are obtained in many practical ways.

Radiant light and heat and ultraviolet rays reflected from luminous sources produce different actions and effects upon pyogenic bacteria, all of which are susceptible to the ultraviolet rays as are all forms of life under varying conditions of exposure. A disadvantage in the use of the ultraviolet rays is that they do not penetrate the skin except when it is rendered anemic by pressure. This was first discovered by Neils Finsen of Copenhagen.

Radiant light and heat reflected from incandescent electric bulbs, preferably from carbon filament lamps, because they produce more heat, will destroy many germs *in situ.* When infection appears near the surface the ultraviolet rays will destroy all germs and fungi when subjected to a few minutes' exposure. Radiant energy reflected from incandescent bulbs, with sufficient energy and long exposures, will destroy the germs in some cases of pyogenic infection, notably the Streptococcus pyogenes. So infections on the surface, and many beneath the skin, will yield to reflected incandescent light either to be destroyed by the light and heat or by the large numbers of phagocytes which come in through the widely dilated vessels. Any measure which supplies heat will induce hyperemia in the tissues of the body, the extent varying with the depth of penetration. The applications of dry heat, radiant light and heat from luminous sources, and diathermy administered from the high frequency electric apparatus, will increase the flow of the blood and increase the presence of the phagocytes—leucocytes and lymphocytes—in the tissues. The increased blood flow through the tissues exposed to the high temperature produce a dual effect, 1, inhibitory to the germs, and, 2, an increase in the number of phagocytes, placing the bacteria more at their mercy.

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*Read by invitation before the Binghamton Academy of Medicine, April 11, 1922.

Hyperemia is the natural response to the action of any measure that produces heat or cold in the tissues. It is the physiological response to heat or cold. Nature thus protects the tissues exposed to heat and cold from burning or freezing. Hyperemia thus increases the local resistance of the tissues against the extension of heat and cold. So the nose and ears become red in a frosty atmosphere because the blood through the part carries the body warmth to these parts to prevent their freezing, or the hyperemia produced by the heat of the sun's rays with the blood at normal temperatures flowing through the part prevents burning, performing beneficent protection to the part exposed.

When we take advantage of a physiological process to effect a therapeutic result we act intelligently, and, though the hyperemia induced by heat for the destruction of bacteria is not necessarily in accord with the usual performance for local protection, it is invaluable as a means of raising the local tissue resistance, thus enabling us to destroy the bacteria present in an infected part. There are three distinct effects to be derived from hyperemia each of which looks to the improvement of the local tissue resistance: 1, an increased local nutrition; 2, increased metabolism, and 3, an increased number of phagocytes in the tissues. To those who have not thought to employ heat from energetic sources to destroy infection the effects will be reassuring.

The x ray and radium have a specific sterilizing effect upon bacteria which is well illustrated in the treatment of tuberculous and pyogenic infections, as in adenitis, tonsillar and other pyogenic infections, and various fungus conditions, as in tinea tonsurans, and sycosis.

For a long time it has been the custom for surgeons to manage cases of virulent septic infection by employing the antiseptic wet dressing in conjunction with stock vaccines. This may succeed sometimes, but it has often been found to be of little value in the treatment of these cases. Its employment is unfortunate, when there are reliable means of controlling the condition. As a matter of fact, when these patients are put under proper management at the outset and treated on the day when the evidence of the infection appears as a red spot on the surface, an exposure of an hour or two of radiant light and heat reflected from an incandescent lamp, or a four minute exposure under pressure from a mercury vapor lamp, will destroy the germs and terminate the infection. Or when the line marking the extension of the infection along the lymphatics is present, it will often be possible to abort a further extension by long applications of radiant light and heat or shorter ones with ultraviolet rays.

It has been demonstrated that in the treatment of these cases, if not promptly aborted by the exposures as described, they are best managed by the application of dry hot air applied at as high a temperature as can be tolerated in an apparatus constructed for the purpose. Such apparatus or ovens are heated by gas or electricity. Place the arm or leg infected, after properly wrapping it, in the apparatus and employ a temperature of from 300° to 500°F. The part to be treated is first wrapped in several layers of Turkish towelling to prevent the accumulation of perspiration upon the surface which would boil and blister the skin. It will surprise those not familiar with the method how well high temperatures are so tolerated.

This is a practical method of treating the worst cases of local septic infection. The part should be placed in the oven daily for at least one hour. Dry heat employed in this way will produce a very active hyperemia in the skin and underlying tissues; whether it is the heat or the phagocytes or both that destroy the germ, it is hard to say, but probably the latter. The blood flowing rapidly in and out through the part probably is never but a few degrees above normal. The extreme degree of heat, however, so far inhibits the bacteria that they are an easy prey to the leucocytes, for from the first administration the process is always checked.

During the past twenty years we have treated in our offices very many of these cases and without a single failure. A few case reports will illustrate the routine and success obtained with the method.

Case I.—Mr. R. was referred to our office by a resident physician with an arm that had been infected for several days. Incisions had been made in a number of places along the arm and forearm for evacuations of pus. This patient was given three succeeding applications of dry heat, applied for one hour each day, when all evidence of the infection had disappeared and the incisions promptly healed.

Case II.—A physician, who came to us, will illustrate the futility of other methods as compared with those which I have outlined. Dr. M., a surgeon from Toronto, Canada, came to us with an infected hand from which he had been suffering for two or three months. He had gone to a well known clinic in Minnesota seeking relief, and was advised to leave it to Nature, but the *vis medicatrix naturæ* had proved ineffective in his case. When we examined the hand it was found that the tendons were not adherent in the sheaths, though the hand had been incised at three places on the dorsal surface. There were two discharging sinuses on the back of the hand, and the end of the index finger had sloughed back to the bone end. The hand was swollen, stiff and useless. We gave him administrations of dry heat on five successive days, and in the intervals between treatments prescribed the use of the reflected incandescent light over his arm and hand for one hour twice daily. Massage, passive motion and exercise were employed. In three weeks he was able to return to his surgical practice with a useful hand.

These cases illustrate the methods and the success attained by a rational treatment of a form of infection from which several surgeons have lost their lives during the past year. Each year adds to the roll, and yet they persist in the use of wet dressings.

In 1910 we treated the first case of erysipelas with incandescent light making the exposures for one and a half hours, as intense as the skin would bear. The treatment was so effective that I was inclined to doubt my diagnosis, but results obtained in subsequent cases and reports from others have confirmed it.

The following case reported by Dr. James R. Bingham, of New York (2), will illustrate the measure of success obtained even in a very bad case, treated by an eminent surgeon:

CASE III.—"A case of facial erysipelas, which had received no treatment for several days after its inception, and therefore was well advanced. One eye was entirely closed by the swelling, and the other nearly so. All the features of the face were practically obliterated, and one ear was very badly swollen and painful.

"I had the light applied for an hour's duration, five or six times the first day, and twice during the first night, as the patient was wakeful. During the second day the light was applied less often, and for shorter periods, and as the patient slept all during the second night it was not applied at all.

"From the beginning the pain was markedly relieved by each treatment, and after the first day there was absolutely no pain complained of by the patient.

"The swelling and redness began to recede from the first application of the light, and at the end of forty-eight hours the only manifestation of the disease remaining was a slight swelling of the involved ear, which entirely disappeared on the third day after a few short applications of the light."

In the winter of 1919, Dr. M. M. Thompson. Captain, M. C., of Pitcairn, Pa., in charge at the Port of Embarkation at Hoboken, when handling gonorrheal cases became infected in one eye and the surgeons diagnosed the condition as gonorrheal ophthalmia. On hearing of his predicament I at once ordered a fifty candle power therapeutic incandescent lamp sent to the hospital. The surgeons had put him to bed, and he was suffering excruciating pain from the infection. When the lamp arrived he applied it as hot as he could stand the radiations, and reported that after half an hour's application the pain had ceased. He adjusted the lamp on a stand at a distance from the bed at which he could tolerate the heat and lay with the light shining upon his eye for the whole night. In the morning when the surgeon came to his room he found the patient's eye was open and free from pain though deeply injected. The surgeon asked what he had been doing. He pointed to the lamp, and the surgeon remarked, "We are never too old to learn." He continued the use of the light for three days, after which time the eye was normal. I believe that this was the first case of gonorrheal ophthalmia treated in this manner.

Three other cases have been reported, and published. One by Dr. M. M. Thompson (3); one by Dr. Lois L. Gannett (4); and one by Dr. F. S. Holladay (5).

To report the cure of such infections as erysipelas and gonorrheal ophthalmia by a measure so readily at hand, to a medical body who may not have previously seen reports of these methods, is presumptuous in the face of recognized medical conservatism, but I could not resist the opportunity; for there is no doubt that the results will be confirmed, as the cases were correctly diagnosed. I, therefore, urge in the interest of humanity that they be investigated and not neglected; because they are unusual.

ACNE AND FURUNCULOSIS.

The treatment of acne and furunculosis and other infections with the x ray is now an established method recognized by the dermatologists everywhere. In simple acne the same method is employed and the advantage of the x ray in these cases is that it causes contraction of the skin and so closes the openings of the sebaceous glands and prevents the formation of comedones.

ADENITIS.

The treatment of tuberculous adenitis with the x ray is also now an established method. When there is no pus or caseous formation which would require evacuation and curettage, diathermy and the x ray will cure these cases with great promptness.

The treatment of enlarged and infected tonsils and adenoids is the latest recognized forward step in x ray therapy. The method of Byron S. Price, (6) and that of Dr. W. D. Witherbee (7) and others confirm the value of the method. Personal experience further confirms the prompt cure of those cases with the x ray.

OTITIS MEDIA.

Radiant light and heat in cases of purulent otitis media are uniformly successful as was first shown by Dr. Herbert F. Pitcher. One hour applications with the lamp suspended at a distance at which the patient will tolerate the heat over the ear and mastoid given daily, will often abort an acute case and within two or three weeks will cure the chronic cases.

FRONTAL SINUS INFECTION AND CORYZA.

The use of light in these conditions, with one hour daily exposures, as in otitis media, prolonged as in the former. In the first stage of coryza, two or three one hour applications within thirty six hours at twelve hour intervals in healthy patients will often cause a disappearance of all the symptoms.

PLEURISY AND BRONCHITIS.

Acute pleurisy and acute bronchitis are successfully treated with diathermy employing the high frequency current by placing a large metal electrode on the anterior side over the chest and one on the posterior side, or on the opposite sides, employing the current as hot as can well be tolerated by the skin for one hour daily. Relief is immediate, as a rule, relieving all symptoms in two or three days. Chronic cases are treated by the same method but take a longer time to effect relief.

PNEUMONIA.

There are no records yet of cases of pneumonia in which this method has been used, but there is no reason to doubt that diathermy is indicated, at the outset, before consolidation has occurred. If diathermy is applied with proper energy, in the future these cases may be aborted. Long applications of radiant light and heat have proved remarkably effective in pneumonia.

CHOLECYSTITIS.

In cholecystitis there is no remedy that will give as much satisfaction in our experience as the employment of diathermy.

Clinical experience after all is the actual index of therapeutic efficiency, and the physical therapeutic laboratories are revealing truths based upon an actual scientific basis that already rival the bacteriological laboratory methods in the therapautics of infection.

885 WEST END AVENUE.

The references will appear in the author's reprints.

Letters to the Editor.

THE TREATMENT OF INFLUENZA

New York, *February* 20, 1923.

To the Editor:

I have found nothing better than the mixture I have previously recommended, consisting of ammonium salicylate, gr. lxxii; caffeine, gr. vi; essence of pepsin, ʒi; water, ℥vi. Of this I, at present, give a tablespoonful every hour for three or four hours, and thereafter a dessertspoonful. For the sake of convenience, in many cases, I give the remedy in capsules instead of solution, and I then omit the pepsin. At bedtime I give aromatic spirit of ammonia and sweet spirit of nitre. I then stop the salicylate mixture. If there is cough and fever, I start warm creosote inhalations from a croup kettle, with or without compound tincture of benzoin. I use benzoin only when objection is made to the smell of creosote.

There is no specific against influenzal pneumonia, but what I have outlined will help prevent it in a measure and will greatly modify its seriousness many times. Good whiskey, black coffee and strophanthus in small repeated doses, will save life, if any treatment will.

Fear of contagion is a bugbear which should not be tolerated. It is lack of knowledge which makes it prevail. Personal immunity is something the wisest physicians do not as yet understand; I mean the why and wherefore.

Beverley Robinson, M. D.

X RAYS

New York, *December* 26, 1922.

To the Editor:

Your editorial X Rays in Diagnosis, appearing in the issue of December 20, 1922, moves me to submit the following reply:

The advantages of an x ray examination of the chest for suspected tuberculosis have been amply demonstrated by radiologists who possess the necessary technical training in this special field of medicine. But it should not be expected of the radiologist to render an absolute diagnosis in those cases which so often puzzle a skilled clinician.

Numerous signs such as the hazy outlines of an active apical infiltration, studding of the bronchi in slow perihilar dissemination, the wedge of dilated vessels or lymphatics, with the apex at the hilum, form parts of a chain that helps to make up the phenomena which the radiologist must learn to recognize and, at the same time, must assign to each its proper importance and interpretation. In many instances repeated examinations are necessary to clear up the diagnosis in suspected cases of early tuberculosis. The chest must be examined with due regard to the possibilities of finding a lurking foci in the mediastinal glands or somewhere in the pulmonary parenchyma. Caseating paratracheal glands or an inverted comma may often be the only suspicion of a beginning tuberculous process. Or, again, a focus of infection may be obscured by superimposed shadows or by the persistent sequelæ of obsolete lesions. To uncover a mask of this type examinations made in the ventrodorsal, dorsoventral, right lateral and left lateral positions are necessary. Even then a group of cases defies the most careful scrutiny with both fluoroscopy and röntgenograms and can only be differentiated by the combined efforts of the clinician and the röntgenologist.

It is only expedient to check the results of radiography by the usual means of diagnosis. Perhaps this is what the editor means when he speaks of pictures "taken with considerable salt"; on the other hand, however, röntgen diagnosis alone has proved decisive. I am sure that the editor cannot mean to eliminate the advantages which the competent röntgenologist can offer the clinician. The clinician and the röntgenologist can cooperate and make each method the complement of the other.

Herman Besser, M. D.

EPIDEMIC ENCEPHALITIS

New York, *February* 16, 1923.

To the Editor:

Epidemic encephalitis (lethargica) is in our midst again. Owing to the fact that we have no definite specific remedy as yet, I should like to stress the use of nonspecific therapy in this disease. Simply to treat those afflicted, symptomatically, is not, in my opinion, using all our armamentarium.

The use of skimmed milk, according to Döllkin, has not shown uniformly consistent results. Then again, it cannot be graded according to reaction, etc. The omnicellular theory of Weichhardt, and its application to the treatment of epidemic encephalitis, is to be preferred to that of Döllkin and his coworkers.

Both on the neurological service of Dr. William Leszynsky, at Lebanon Hospital, and in my own practice, we have used sodium nucleinate very effectively in the acute as well as in the subacute type of this disease. The physiological and pharmacological effects of this protein on the body and the blood is well known—stimulation of the entire organism, with the increased production of leucocytes and their phagocytic action, together with the increase of the antibodies. Then again, in the histopathology of epidemic encephalitis, the virus does not arouse a reaction sufficient it seems to produce antibodies, which makes the use of this substance highly desirable from this viewpoint.

We standardize the solution, using sterile water, so that one grain equals five minims of the solution. It is used subcutaneously. Each case is judged by itself, as to how much should be used, particularly the initial dose, in view of the severe anaphylactic phase that often follows. In cases presenting a temperature above 102° F., one should start with a half grain, and then work up.

At Lebanon Hospital we use the blood reaction as an index, particularly in the subacute stage. In the acute stage the temperature and the general aspect of the individual must be taken into consideration as a guide for reaction. In the blood examinations we naturally take the total white and differential before and after the administration of the protein. Six injections was the highest number used, and it was in a case that should have gone on to be a classical case of Parkinson's disease type, by all the rules of this disease. The patient has been back to work as a letter carrier for nearly a year. What the future will show I cannot say.

Joshua H. Leiner, M. D.

Abstracts from Current Literature

MALIGNANT GROWTHS.

Radiotherapy in Cancer.—G. E. Pfahler (*International Journal of Surgery,* December, 1922) gives the following summary: Radiotherapy, when practical, should be used preceding and following operations. Electrocoagulation can, in many instances, be used to advantage to replace excision, because the bloodvessels and lymphatics are sealed off in the process of destruction and there is a heat zone beyond the area of actual destruction which will destroy carcinoma. Radiotherapy can be used with success in nearly all superficial cancers. Radiotherapy will in some instances cause a complete disappearance of even deep seated malignant disease. If it is known that cancer can be cured by radiotherapy, disastrous delays on the part of patients will be avoided. Skill is required in the use of radium, x rays and electrocoagulation, just as skill is required in surgery.

Treatment of Breast Cancer.—F. E. Bunts (*Annals of Surgery,* September, 1922) concludes that the successful treatment of cancer of the breast, as of any other pathological condition, should be strictly individualized. The ultimate sequelæ depend more upon the stage and dissemination of the growth when it is presented for treatment than upon any defined method of operation. Greatly increased data regarding the value of the preoperative and postoperative use of the x ray and of radium are required before final conclusions can be drawn, although there seems little doubt of the value of radium applied directly in the axilla. The substitution of the x rays or of radium for surgical treatment cannot safely be considered at the present time. The early removal of any growth remains the one and only sure method of treatment.

Cancer of the Breast. Treatment of the Proemial Breast.—G. Lenthal Cheatle (*British Medical Journal,* June 3, 1922) calls attention to a potentially dangerous state of the breast and indicates the advisability of the removal of the breast while still in this state rather than later, when surgery gives unsatisfactory results. The reasons for the failure of surgery in primary, clinically recognizable cancer of the breast are: 1, its insidious onset, giving no symptoms until the disease is too far advanced for a cure; 2, the patient does not always seek medical aid early enough; 3, the present five year period of quiescence is too short; 4, the clinical symptoms do not always coincide with the malignancy or the benign character of a tumor. It is therefore advisable to deal adequately with breasts in which cancer or papillomatous growths are likely to occur and not to wait for definite signs. Such a condition of the breast is called the "proemial breast."

Not every nodular breast is pathological, as most adult female breasts, unless there is much fat in them, are multinodular, the nodules being prominent mammary ducts, recognizable by careful palpation or the direction of the ducts, the ducts becoming smaller toward the periphery of the gland. The proper method of palpation is to support the pendant breast with one hand and to palpate with the fingers of the other. It should be remembered that painfulness may be due to a physiological vascular turgescence. The proemial breast is worthy of due recognition for two reasons: 1, it is a forerunner of further pathological changes, such as simple papillomata, malignant papillomata and other forms of cancer; 2, its recognition and proper treatment aid the surgeon in recognizing (microscopically) possible malignant changes sooner than in any other way. When once established, the condition of the proemial breast is permanent.

Clinically, there is pain in the breast at an age of forty to forty-five years, occasionally severe, persistent and continuous. Both breasts may be nodular, but in the diseased breast the nodules are swollen, painful and tender and of unequal sizes in corresponding parts of the gland; the swollen nodules are composed mainly of prominent ducts. Segments of the gland or the whole gland may be affected. There may be an intermittent or continuous discharge from the nipple, or a thin layer of coagulated serum on the surface of the nipple, always small in amount. In the later stages the pain disappears and cysts are formed. Severe massage may induce a thick, white discharge from the nipple, containing desquamated epithelial cells, but this should not be done because of the possible presence of cancer and its consequent dissemination. Frequently cases diagnosed as proemial breasts show the presence of a malignancy. The treatment in every stage is removal of the breast with dissection en bloc of the fascia over the pectoralis major muscle with the lymph nodes attached. The removed breast should be carefully and thoroughly examined microscopically for the presence of cancer and if found, the skin covering the breast, the pectoralis major and minor muscles and the parts around the axillary vein should be completely removed.

Radiotherapy in Carcinoma of the Breast.—George E. Pfahler (*Surgery, Gynecology and Obstetrics,* August, 1922) concludes that it has been shown that thorough radiation treatment of cancer tissue will devitalize the cancer cells so as to interfere with their inoculation or further development. This justifies our recommendation of anteoperative treatment. It has also been shown that radiation effects are most evident on new growing tumor and such radiation will prevent the growth of inoculated tumors. Therefore, we recommend active postoperative treatment in cancer of the breast. Visible and palpable recurrent metastatic cancer are probably only an index of similar disease elsewhere, and therefore, the treatment of these cases should not be confined simply to the palpable and visible disease. Such visible and palpable disease should receive the most active treatment and sufficient to cause its destruction and disappearance. Thorough radiation treatment will cause the disappearance of tumor tissue in some cases and, therefore, can be recommended when there is any reason for avoiding an operation. In every case of cancer of the breast there should be an x ray examination of the chest, and this should be repeated from time to time to detect any possible invasion of the mediastinum or lungs, sternum, or spine.

Carcinoma of Breast.—Burton J. Lee (*Annals of Surgery,* September, 1922) emphasizes the following points: Primary inoperable carcinoma of the breast has shown good results by radiation. The patient must be kept under constant clinical observation. The type of radiation must be properly selected for each individual case. No routine prescription will suffice. Overtreatment by radiation must be avoided. Very advanced cases are unsuitable for any form of treatment. The palliative operation following properly planned radiation is of service in well selected cases. A cooperating social service department makes a followup system effective and gives humanitarian relief to the hopeless cases. The results to date are gratifying and encouraging. As the disease itself and the technic of radiation become better understood, we believe that more and more satisfactory results will follow.

A Review of Three Hundred Cases of Breast Disease.—The material upon which this review by Irvin Abell and Stuart Graves (*Southern Medical Journal,* May, 1922) is based consists of three hundred cases coming under observation up to and including 1920. Two of these were of sarcoma, 138 of carcinoma, and 160 of various types of benign disease. Of the 138 carcinomata 136 occurred in women, 100 were in married women, 36 in unmarried. The youngest patient with carcinoma was twenty-six; the oldest seventy-eight. The following operative results were obtained: Number of cases of carcinoma operated in, 110; number of patients living and well, 49—44.5 per cent.; number of patients known to be dead, 34—31 per cent.; number of patients dying in hospital (operative mortality), 4—3.6 per cent.; number of patients dead "cause unknown," 11—10 per cent.; number of patients dead "recurrence," 19—17.4 per cent.; letters to carcinoma patients returned "unopened," 12—11 per cent.; letters to carcinoma patients "unanswered not returned," 10—9 per cent.; number of patients living but having recurrence, 5—4.5 per cent.

Carcinoma of Rectum.—J. R. McVay (*Annals of Surgery,* December, 1922) asserts that rectal carcinomata are the most common form of intestinal neoplasms and make up four per cent. of all the cancers of the body. The majority of patients are in the sixth decade. The males predominate slightly. The location of the growth on the rectal wall varies. About as many occupy the anterior wall as the posterior. The greater number of the growths are from the ampulla to the rectosigmoidal juncture. Adenocarcinoma is the most common type. Metastasis to the glands usually takes place slowly and the liver is the organ most affected by secondary growths. The other organs of the body are only rarely affected. The size of the growth in the rectum cannot be relied on as an accurate index of the probable lymphatic involvement. The growths without lymphatic involvement tend to grow into the lumen of the bowel. The growths with slight lymphatic involvement tend to spread by direct extension and are slow growing. Carcinomata of the rectum with extensive lymph glandular involvement tend to metastasize through the lymph stream early. Occasionally metastasis may take place by emboli breaking off into the portal veins. Metastatic lymph glandular involvement can only be definitely determined by systematic microscopic study of all the regional lymph nodes. The size of the lymph node is not an efficient means of determining whether or not there is metastatic involvement. This is especially true if the amount of involvement is small, or if the process is an early one. Systematic microscopic examination of all the regional lymph nodes in carcinoma of the rectum offers, as it does in cancer of the stomach, the best method of establishing an accurate prognosis for the case.

Metastasis in Massage in Malignant Tumors.—L. C. Knox (*Annals of Surgery,* February, 1922) concludes: Study of human material in many ways suggests, but does not finally prove, the importance of massage as a means of inducing metastasis of tumor cells. In animals, on the contrary, very gentle massage for a total period of from two to five minutes, distributed over a number of days, has been shown to set free numerous particles of tumor which form emboli in the lungs. Such emboli produce metastatic tumors in a variable proportion of instances, depending upon the growth activities of the tumor. Tumors which take in low percentages when implanted in the subcutaneous connective tissues give much fewer metastases than those of high virulence. Carcinomata and also sarcomata of the loose polyhedral cell type are easily generalized, but sarcomata of the compact spindle cell variety are not influenced. The importance of avoiding diagnostic or operative manipulation of a tumor in man is obvious.

Swelling of the Arm After Operations for Cancer of the Breast.—William Stewart Halsted (*Bulletin of the Johns Hopkins Hospital,* October, 1921) concludes that swelling of the arm follows the plastic operations in greater proportion and in more pronounced form than is seen in the cases of cancer of the breast treated by skin grafting. In the skin grafting operations at Johns Hopkins Hospital, conspicuously swollen arms have become almost a thing of the past after the method of pressing back the flaps at the upper part of the wound and stitching their edges to the underlying costal muscles was adopted. A search of the records of Johns Hopkins Hospital for cases of swollen arm following carcinoma of the breast supports Halsted's view that infection is frequently, if not usually, the overlying cause of the swelling of arms whose main lymphatic channels have been blocked by operations.

Sarcoma of Long Bones.—H. W. Meyerding (*Surgery, Gynecology and Obstetrics,* March, 1922) from his studies summarizes as follows: 1. Thirty-five per cent. of the cases were inoperable or patients refused operation. In many instances early diagnosis would have given the patients a chance for cure. 2. Thirty-two of the thirty-five patients who died had amputations. The average duration of the disease at the time of their examination was 7.34 months, and they lived an average of 14.5 months after operation. The average duration of life of the thirty-two patients was 21.9 months. One patient who had a fibrosarcoma was examined nine months from the onset of the disease and lived thirty-six months after operation, a total of forty-five months, the longest duration of life in those who have died following amputation. 3. The most malignant sarcomata in the series of thirty-two patients were the osteosarcomata. Eight of these patients, the average duration of whose symptoms was 2.5 months before examination, lived seven months after operation, a total average of 9.5 months. 4. Ten patients have died who had had excision and cautery. The average duration of symptoms was 6.6 months, the average duration of life after operation, 28.2 months, and the average length of life from the time of the onset of symptoms, 34.8 months. One patient with osteosarcoma, who was examined two months after the onset of the disease, died six months after a local operation. Five patients treated by excision and cautery died of pulmonary metastasis. 5. Twenty-one (31.8 per cent.) of the sixty-six patients in the series who had amputations are reported to have died of metastasis to the lungs. The average length of life of these patients was 21.9 months. 6. The value of microscopic proof of malignancy of tumors of the long bones is obvious, inasmuch as the fate of an extremity may depend on such proof. If any doubt exists with regard to the character of the tumor, section from various portions should be examined. 7. A diagnosis should be made only after thorough clinical, physical, and röntgenographic examinations have been made, and even then cannot always be determined until an exploratory operation and microscopic examination rules out giant cell tumor, chondroma, fibrocystic or cystic disease, syphilis, and osteomyelitis. The principal points to be decided before operation are malignancy, metastasis, and the extent of bone involved. With early diagnosis, with eradication of the tumor, with care to exclude patients with metastasis, and with the use of radium, röntgen ray, and Coley's toxin, prolongation of life may be looked for following operation.

Changes in the Esophagus with Lymphosarcoma and with Lymphogranuloma of the Mediastinum.—Martin Haudek (*Wiener klinische Wochenschrift,* June 8, 1922) reports two cases. The first case showed penetration of a lymphosarcoma into the esophagus, which was demonstrated röntgenologically and with the esophagoscope, and the second case showed dislocation of the esophagus and trachea by a mediastinal tumor.

The first patient was a female, twenty-three years old, who for several weeks noticed dysphagia associated with a generally run down condition. Both sides of the neck showed lumps of lymph nodes. The röntgenogram showed very large masses in the upper right mediastinum, overshadowing the heart; the esophagus was pushed to the right and backward and there was a stenosis above the bifurcation of the trachea. The diagnosis of extensive adhesions of the mediastinal tumor with the esophagus and a penetration of the same into the wall of its lumen was made. This finding was confirmed by esophagoscopy. The necropsy showed a colossal dilatation of the esophagus, such as rarely occurs even in carcinoma. The röntgenogram showed the combination of the characteristic features of all the processes which affect the esophagus: 1, dislocation by a tumor pressing from without; 2, a coarsely irregular contour of the shadow of the stenosis usually found in obturative stenosis (carcinoma of the esophagus); 3, the fractional diverticulalike processes of the contrast shadow. There was also a characteristic stippling of the contrast shadow.

The second patient was a man, fifty-six years old, who took sick with multiple glandular swellings. A lymphogranulomatosis was diagnosed at first, but the use of x rays changed the condition so markedly that a diagnosis of glanuloma was made. The mediastinal tumor and the glandular tumors of the axilla and neck disappeared entirely. The röntgenogram showed a dislocation of the esophagus by compression from without, an irregular contour of the shadow, as is seen in a process involving the walls and displacement of the esophagus as in periesophagitis. The absence of dysphagia showed that the subjective symptoms and the objective findings do not always go hand in hand in the esophagus.

NEUROLOGY.

Anatomy of the Cerebellum. — S. Ingvar (*Hygeia,* December 16, 1922) concludes, after an exhaustive study of the anatomy of the cerebellum, that this organ instead of being a motor organ as is often held, depends in a marked degree upon the peripheral impulses it absorbs, just like all other reflex organs. The cerebellum is an organ of equilibrium, that is to say an organ which to preserve equilibrium, a dynamic postulate for all creatures, succeeds in neutralizing and influencing by reflex action, the static and kinetic forces surrounding us due to the physical laws of gravity, etc. The author mentions Ramsay Hunt, of New York, and Walsh, of England, as sharing his views. Everything seems to point toward the fact that the afferent peripheral impulses, upon which the reflex activity of the cerebellum depend, are of an exclusively static and kinetic nature. As the physical laws of gravity, etc., are common and identical for all, it is comprehensible why the cerebellum in all vertebrates offers not only the same histological picture but also develops according to the same morphological stages.

A Case of Localized Suppurative Meningitis Over the Motor Cortex.—C. P. Symonds and W. H. Ogilvie (*Lancet,* August 5, 1922) report a rare case of a sharply localized patch of suppurative meningitis over the motor cortex, separated by at least two inches of healthy tissues from the source of the infection—the middle ear and mastoid process. The mastoid process was in an early stage and the obvious bone disease affected only that part of the mastoid process furthest away from the cranial cavity. From the surgical viewpoint there were three routes of infection: 1, the labyrinth and internal auditory meatus; 2, the diploë of the squamous temporal bone, and, 3, the direct spread through the subarachnoid space. The first route may be definitely excluded by the absence of corresponding symptoms. If the disease had spread by the second path, there would have been visible infection of the diploë in the squamous temporal bone and a localized patch of infected dura, neither of which was present. The bacteria probably traveled from the middle ear to the motor cortex via the lymphatics of the bone, the dura and the subarachnoid space, but the resistance of the intervening tissues was great enough to prevent any manifest infection. Neurologically the main facts of interest in the early history of the case are the completeness and sudden onset of the brachial monoplegia in relation to quite a superficial cortical lesion and the absence in the early stage of focal epileptic attacks, which only supervened as a penultimate phase preceding the recovery of voluntary power. This sequence of events is the exact reverse of that seen in progressive destruction of the motor cortex by a meningeal tumor. Taken together, these two observations show that the epileptic discharge depends upon a condition of the motor nerve cells, which lies somewhere between the two extremes of normal activity and complete inexcitability. In this case this optimum point for an epileptic discharge may be passed before a seizure has had time to mature. The lesion probably affected the anterior part of the postcentral convolution in its lower half.

Epidemic Encephalitis.—C. Kling (*Hygeia,* 84:894, November 15 and 30, 1922) concludes from his experiments that: Experimental herpes encephalitis is of quite another character than epidemic encephalitis in the rabbit. The characteristic symptom of the herpes virus, purulent keratoconjunctivitis after inoculation of the cornea, is missing when the encephalitis virus is used. The convalescent serum of encephalitis has a neutralizing action in vitro on the encephalitis virus but not on the herpes virus. The hitherto undertaken experiments in immunity point to a marked difference between the two. In studying the epidemic in Sweden, the author was impressed by the number of abortive cases and suggests the possibility of the disease spreading through carriers who are in good health themselves. The chronic forms, of a progressive character with alternating remissions and relapses, have been found to show symptoms of various nervous diseases, the etiology of which has hitherto remained obscure, i. e., Sydenham's chorea and even simple chorea. Huntington's chorea and chorea electrica have been looked upon by some authorities as sporadic types of epidemic encephalitis. Parkinson's disease is considered by some as nothing other than a chronic manifestation of the encephalitis virus.

Toxiinfectious Lesions in the Central Nervous System.—David Orr and A. Corsar Sturrock (*Lancet,* August 5, 1922), from a series of experimental investigations into the influence of disturbances of the sympathetic mechanism on the localization of these lesions, draw the following conclusions: 1. Sympathetic division alone produces vascular dilatation, perivascular edema, slight proliferation of adventitious cells, which may be a response to increased permeability of the vessel wall from sympathetic paresis and the release of certain noxious products from the circulation; also morbid nerve cell changes. The areas affected were those supplied by the pial vessels: the cornu ammonis and fascia dentata, the caudate and amygdaloid nuclei, the pyriform lobe and the cortex cerebri. 2. Division of the cervical sympathetic is followed by a general intoxication and the lesions are found in the same areas but in a much greater degree and the unilateral division of the sympathetic intensifies the toxic morbid lesion on the same side. The areas involved in both experiments were the archaic regions of the brain and the cerebral cortex. These are all supplied by the pial vessels (under sympathetic control). It would appear, therefore, that the sympathetic nervous system is an important factor in toxiinfective inflammation and degeneration and its involvement is a contributory factor in the localization of lesions, not only in the central nervous system, but probably wherever they may occur. 3. The periarteritis in the head of the caudate nucleus is so well defined and so localized as to seem of special significance; this area is in direct communication with the basal cortex and therefore with pial supply. 4. The lipoid secretion in the ventricles and choroid plexus is an active process, as shown by the intense and early secretion of the lining epithelium; it is a protective as well as a regenerative mechanism. 5. The lesions described above show definite changes in the archaic areas and cortex and are produced through interference with the blood supply without toxic influence, although the additional intoxication intensifies the reaction. A healthy circulation is essential for the maintenance of balance of the various reciprocating portions of the nervous system and a healthy psyche depends upon it to a great extent.

Venous Angioma of the Cerebral Cortex.—Charles A. Ballance (*Lancet,* July 15, 1922) reports a case of angioma of the cerebral cortex which is one of the rarest of brain tumors. The interesting features of this case were the following: 1, The sensory aura beginning in the face; 2, the absence of any change in cutaneous sensibility; 3, the absence of optic neuritis; 4, the extremely large size of the veins forming the angioma; 5, the marked improvement following operation—presumably due to the relief of the local pressure. As this condition, undoubtedly, was congenital, it is remarkable that the increase in size, which is a common feature of these tumors, did not produce symptoms until the age of twenty-seven. This case, together with two others previously reported, showed the following features in common: 1, epilepsy as the first symptom with a relatively slowly developing hemiplegia; 2, epileptic attacks of the Jacksonian type, preceded by a definite trauma; and, 3, the absence of optic neuritis.

Relationship of Syphilis to Diseases of the Central Nervous System.—Francis M. Barnes, Jr., (*Medical Clinics of North America,* July, 1922) concludes that syphilis of the central nervous system may produce clinical pictures which, casually, may easily be confused with almost any other disease of the central nervous system and this, even after the most careful study and investigation. Wherever there is a possible underlying factor of syphilis, in any disease of the central nervous system, adequate antisyphilitic treatment should be given. However, the therapeutic test is not ultimately final and syphilis cannot be excluded simply because a patient supposedly syphilitic does not respond to antisyphilitic measures.

Zinc and Copper Content of the Human Brain.—Meyer Bodansky (*Journal of Biological Chemistry,* October, 1921) found in the analysis of one fetal and four adult brains that copper and zinc are normal constituents of the human brain. The analysis of the fetal brain suggests that during intrauterine life there is more rapid storage of zinc and copper in the brain than there is after birth, the behavior of these elements being in this respect similar to that of other inorganic constituents of animal tissues, such as iodine, sulphur, and phosphorus.

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GASTROENTEROLOGY.

Focal Tenderness in the Diagnosis of Gastric Ulcer.—George Vilvandré (*Lancet,* May 27, 1922) lays great stress on the value of focal tenderness obtained by palpating with one finger along the whole of the lesser curvature, from a point near the cardia, starting from the infrachondral margin, down as far as the pylorus. In doubtful cases pressure with the tip of the index finger elicits definite pain over the region of the ulcer. This sign is not found when the patient lies on his back, but only when he stands upright. This pain may occur on palpation even without the presence of spontaneous pain. The stimulus is definite at a given point, repeatedly obtained, rapidly disappearing and sharp. It is not found in chronic lesions, the nerve endings being destroyed by ulceration.

Death in Intestinal Obstruction.—J. W. Ellis (*Annals of Surgery,* April, 1922) concludes that from the intestinal content in cases of high obstruction, a poison can be isolated by precipitation with alcohol, extraction with boiling water and reprecipitation with the aid of magnesium sulphate. It is not possible to obtain such a poison with this method from the intestinal content of a normal dog prepared immediately after removal. A poison which, when judged by the means at our disposal, is identical, can be obtained from conditions other than actual obstruction, such as the intravenous injection of the high obstruction toxin into normal animals, the removal of the adrenals, portal obstruction, and in experimental, acute, fulminating, nonbacterial peritonitis. This poison is undoubtedly elaborated in the cells of the greater part of the mucosa of the small intestine, but chiefly in those of the duodenum, and is manifestly excreted, partly into the lumen of the intestine, but the larger part passes into the lymph stream. The clinical similarities between acute pancreatitis and high obstruction are due either to a close relationship between the toxins involved, or possibly to the fact that acute pancreatitis actually produces conditions in the intestinal mucosa favorable to the production of the same toxin, as is found in cases of high obstruction. Since erepsin fails to exert any action upon the toxin, and since the toxin shows no lymphagogic action whatever, it seems necessary to conclude that the toxin is neither a proteose nor a heretoproteose. The clinical advantage of gastric lavage may be explained by the removal of the toxic content and the favoring thereby of an increased excretion into the lumen of the intestine. To this treatment should be added the introduction of large amounts of saline, both intravenously and by the rectum, to further the excretion of the toxin both by the bowel and by the kidneys. The finding of the toxin in the intestinal content after the removal of the adrenals suggests that clinically adrenalin should be added to the saline infusion in sufficient amount so that a continuous supply of adrenalin is being furnished.

Foreign Bodies in the Duodenum.—In a series of fifteen cases of foreign bodies in the digestive tract, Waldemar Goldschmidt (*Wiener klinische Wochenschrift,* August 3, 1922) found the duodenum to be the most frequent portion of the digestive tract (below the stomach) in which the foreign body was arrested (twice in the stomach, five times in the duodenum, four times in the small intestine, twice in the cecum, once in the hepatic flexure, three times in the transverse colon, once in the sigmoid and four times in undetermined locations). The duodenum is not only the site of the most frequent arrest of the foreign body but it is also the site of the most frequent perforation.

The X ray in the Diagnosis of Certain Gastroenteric Lesions.— Lowell S. Goin (*Illinois Medical Journal,* July, 1922) says that one often encounters a tendency to regard the x ray findings as a diagnosis; to regard the röntgen laboratory as a place where complete diagnoses are miraculously produced. This is a conception which must be discouraged. The findings of the röntgenologist are often an invaluable adjunct to the clinical findings, but in the final analysis it is the clinician who accepts the responsibility of the diagnosis and prognosis, and it is he who must learn to view the röntgenologists' report in its true light of specialized information.

Tetanus Bacillus as an Intestinal Saprophyte in Man.—Carl Tenbroeck and Johannes H. Bauer (*Journal of Experimental Medicine,* September, 1922) examined stools from seventy-eight male Chinese patients, and from 34.7 per cent. of them obtained organisms which in their morphology and toxin producing properties were tetanus bacilli. The history of the positive cases showed little to bear on the problem. The only method that was found reliable for detecting tetanus bacilli was the culturing of the suspected material, the isolation of tetanuslike organisms and the demonstration that the pure cultures form a spasm producing toxin that is neutralized by tetanus antitoxin. A study of patients who had been in the hospital for some time, and who received practically sterile food, showed that they continued to eliminate tetanus spores in their stools, indicating that the tetanus bacilli were multiplying in the digestive tracts of the patients.

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Pathogenesis and Treatment of Exophthalmic Goitre in the Light of Our Present Knowledge

By ALFRED GORDON, M.D.,
Philadelphia.

INTRODUCTION.

The long history of Graves's syndrome indicates the difficulty which clinicians and pathologists experience in their orientation with multiple symptoms and anatomical lesions. Recent researches in this field have not advanced to any extent our knowledge of the subject. A critical review and analysis of the accumulated data, especially from the viewpoint of the pathogenesis of the affection, will perhaps be of some practical value. A description of the fundamental and accessory symptoms which are well known will be omitted. The pathogenesis is the chief concern in this analysis and the treatment will appear as the logical deduction.

PATHOGENESIS.

As long as the understanding of thyroid functions did not reach the stage of our present knowledge, the disease under discussion was generally considered of nervous origin. It was only with observations on myxedema, in which treatment with thyroid extract produced symptoms resembling Graves's syndrome, that a new orientation took place with regard to the origin of exophthalmic goitre.

At present we witness two views; one is that Graves's disease is of nervous origin, and the other attributes the affection largely to a disturbed thyroid function.

FIRST VIEWS.

As to the first, we are in possession of numerous incontestable facts: Barie (1), Mendel (2), Marie et Marinesco (3), and others observed Graves's syndrome in tabes and considered a lesion of the solitary bundle, which is connected with the ninth cranial nerve in the medulla, as the pathological cause of the disease. Joffroy observed exophthalmic goitre in a case of syringomyelia in which he found an angiomatous dilatation of the superior cervical cord and of the posterior portion of the right hemisphere.

The disease was also observed in cases of paresis. Jendrassic published a case of poliomyelencephalitis due to lead poisoning; at a certain moment the bulbar centre became affected and the patient presented the picture of Graves's disease. Parkinson's disease was also observed in association with Graves's disease; myasthenia gravis, encephalitis lethargica, acromegaly, gigantism, and tetany are the other affections of nervous origin.

Some authors are in favor of the cervical sympathetic nerve. They believe that stimulation of the latter produces tachycardia, exophthalmos, dilatation of thyroid arteries, and secondarily, secretory disturbances of the thyroid body. In favor of this contention are the older experiments of Dastre and Morat and the more recent ones of MacCallum and Cornell in 1904. Dastre and Morat long ago had shown that the vascular dilatation brought on by irritation of the cervical sympathetic nerve was manifest when it was directed to the communicating branches of the second, third, and fourth dorsal pairs, and to the segments of the ganglions where these branches terminated; the dilator fibres exist together with the constrictors in the sympathetic nerve. Morat also demonstrated that the inferior cervical ganglion was the principal source of the acceleration of the heart and of vasodilators of the thyroid body. Wilson (4) stimulated the superior cervical ganglion in a dog and found changes in this ganglion as well as in the thyroid. Brian demonstrated long ago an increase in the size of the thyroid after a section of the sympathetic nerve followed by an injection of pilocarpine. For the nervous origin of Graves's disease speaks the influence of emotional factors on its outbreak or on its recurrences. Mosconi (5) calls the thyroid "the gland of emotion." Laignel-Lavastine (6) observed symptoms of the disease occurring intermittently in the course of tabes and coincidentally with gastric crises. The same author, together with Bloch, observed it in a case of pleuritis of the pulmonary apex reaching the cervical sympathetic.

It is a well known fact that the basal metabolism in Graves's disease is greatly increased: in some cases as high as sixty-six per cent. This phenomenon is due to an increased activity of the vegetative func-

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tions, the result of stimulation of the sympathetic system. It seems, therefore, that some, if not all, of the manifestations of Graves's disease are due to the excitation of the sympathetic system.

ENDOCRINE THEORY.

The second view concerning the pathogenesis of Graves's disease is the endocrine theory.

Möbius (7) was the first to consider hyperthyroidism as the origin of Graves's disease. Experiments and clinical observations following Möbius's announcements have abundantly indicated the probability of his contention. It is sufficient to call attention to Klose's feeding of dogs with thyroid secretion from a case of Graves's disease and the result which was fever, tremor, sweating, tachycardia, and exophthalmos.

CLINICAL DATA.

Clinical experience shows that thyroid extracts employed in various pathological states provoke, when given in large doses, untoward symptoms resembling those of Graves's syndrome. Moreover, in Graves's disease the susceptibility to thyroid extracts is very often great so that the smallest doses of thyroid may provoke accidents. These facts are the strongest arguments in favor of the view of hyperthyroidism. It is also well known that simple goitre is not infrequently the origin of Graves's disease. As an endemic disease in France, in the Alps, Pyrenees, and Jura it is not an easy matter to distinguish simple goitre from exophthalmic goitre. Lesions of the thyroid, such as acute thyroiditis which is frequent in infectious diseases (8) have been the point of departure for Graves's disease.

MIXED TYPES.

On the other hand, competent investigators have shown that not in every case of Graves's disease is there hyperthyroidism. For example, Gley and Cléret in 1911 with intravenous injections of thyroid secretion (from a case of Graves's disease) brought about weakened cardiac beats with decrease of arterial pressure. Even the Goetsch reaction does not always prove its claim: In five of my cases of Graves's disease the reaction was negative in four and positive in only one. Garnier and Bloch have obtained only sixteen positive adrenalin reactions in forty-eight cases (9). Of the same order are the facts of coexistence in the same patients of symptoms of myxedema (which means hypothyroidism) with those of Graves's disease. Similar coexistence of opposed symptom groups has been observed with regard to other endocrinic glands, which shows that the mode of action of endocrinic secretions is not better known in normal than in pathological conditions. The conclusions to which such facts lead are that in Graves's disease the thyroid function is perhaps altered and that excessive thyroid secretion probably plays a certain rôle. That other elements participate, especially the sympathetic, there can be no doubt.

RELATIONSHIP TO GRAVES'S DISEASE.

The difficulty of explaining readily the exclusive part played by a disturbed thyroid gland in the creation or in the accentuation of Graves's syndrome, also the interrelation between various endocrinic glands, led some investigators to determine whether other endocrinic glands besides the thyroid participated in the pathogenesis of the disease under discussion. As to the parathyroids, their function is different from that of the thyroid. While both contain iodine and secrete an acidophilic colloid matter, in the parathyroid these substances exist only in adults and especially in the aged.

The adrenals, it is admitted, produce a thyroid overactivity. Their action may be dependent upon the sympathetic, and vice versa (10). Goetsch, basing his contentions on the view of Falta, Eppinger, and Rudinger, has shown an accentuation of the Graves's symptom group from a hypodermic injection of half a milligram of adrenalin, demonstrating a reciprocal action of thyroid and adrenals by which they reinforce each other in the causation of cardiovascular disturbances and glycosuria (11). Oswald (12) has shown that, after an injection of thyroglobulin, extracted from the thyroid gland, adrenalin increases still more the arterial pressure. The rôle of the pituitary gland is uncertain outside of acromegaly and gigantism. Operation on the pituitary or on the thyroid produced a reciprocal pathological effect. The liver and pancreas have also been observed as having a certain effect on thyroid function.

MIXED DYSFUNCTION.

One writer, Cacika, considers Graves's syndrome due to a disturbed function of the pancreas, hypophysis and adrenals. The pluriglandular pathogenesis has some adherents, but conversely there are also in the literature contradictory data on this particular phase, all showing that their rôle is uncertain and not constant. None of them presents the general characteristics which are evident in the thyroid gland.

In this mass of confusing information one fact nevertheless stands out unaltered, namely, that in Graves's disease hyperthyroidism is present. Moreover, when the activity of the thyroid is checked or diminished by surgery or radiotherapy the Graves's syndrome is considerably benefitted. From the latter viewpoint several propositions may be considered; whether in hyperthyroidism the excessiveness of thyroid secretion alone, or an alteration of this secretion, or the remaining healthy portion of the thyroid gland is to be incriminated in the causation of Graves's syndrome. No definite solution can be offered from the state of our present knowledge.

PRIMARY FACTORS.

The question naturally arises: In view of the existence of several pathogenetic conditions in Graves's disease—the sympathicotonia and hyperthyroidism, which of the two can be considered as the primary factor? The reciprocal influence of both is well known. The largest number of observers consider the action of the thyroid as the primary cause, or the Graves's syndrome as due primarily to the effect of a toxic substance originating in the thyroid and irritating the sympathetic system secondarily. If it is so, why is it that it excites only the cervical sympathetic and why should it not have the same effect upon the other sympathetic nerve which will act on the abdominal aorta, iliac, and femoral arteries? Besides, there are cases in which there is enormous exophthalmia associated with an insignificant thyroid enlargement and moderate tachycardia, and vice versa. There are also cases without struma. There are cases with unilateral symptoms. How is it possible that a general toxemia by abnormal thyroid secretion can produce conditions like these?

There are also cases in which genital affections determine exophthalmic goitre, cases in which a floating kidney produces the same condition which subsequently disappears when a suitable abdominal belt is put on to support the kidney. Enteroptosis and gastroptosis have been followed by Graves's syndrome. The same was observed in nasal polyps, and hypertrophy of turbinated bones. Tillaux performed a successful thyroidectomy and four years later exophthalmic goitre developed. On the other hand, Filehne injuring a certain spot in the medulla in rabbits produced the symptoms of Graves's disease. At autopsy were found hemorrhage of the fourth ventricle, dilatation of bloodvessels and atrophy of funiculus solitarium.

THE NERVOUS SYSTEM.

Mention was made above of organic diseases of the nervous system in which Graves's syndrome eventually developed. All these facts tend to prove that in Graves's syndrome all the phenomena are the result of a permanent irritation of the vasodilator nerves situated in the cervical sympathetic nerve, and as the vasodilators of the head and heart have their deep origin in the medulla, it is there that we must look for the explanation. The sympathetic nerve sends its nervous filaments to the bottom of the orbit, the thyroid gland, and the cardiac plexus. With a permanent irritation of the vasodilators coming from its centre there is a constant afflux of a considerable amount of blood to the thyroid and retrobulbar vessels. It seems, therefore, that the sympathetic nerve is the immediate cause of Graves's syndrome.

Accepting this contention as correct, one should not lose sight of the fact that Graves's syndrome may be brought into evidence or become accentuated the more readily as the more sensitive is the sympathetic system. Excitation of the latter may result from many conditions, among which an important place is given to endocrinic products, the hormones or metabolites (Gaskell) which the English authors call "chemical messengers." These products determine a great variety of reactions which may become associated or destroyed according to the state of the secretory organs. The presence of apparently contradictory manifestations in the course of Graves's disease is due precisely to the activity of the various hormones and by no means invalidates the condition which seems to be the principal one in the mechanism of Graves's syndrome. Their presence depends upon whether they stimulate the sympathetic or the vagotonic portion of the vegetative nervous system in any given case of the Graves's symptom group. Moreover, the excitability of these systems is probably not uniform in all their portions, which explains also the diversity of their reactions. A brief description of these two systems seems to be warranted at this juncture.

SYMPATHETIC SYSTEM.

The sympathetic system originates in the spinal cord from the second thoracic to the second lumbar segment. It controls vasomotricity, pilomotricity, the smooth fibres of the dilator of the iris, the sphincters of the digestive and urinary apparatus, the sudoral secretion, and the chromaffin apparatus. A functional disturbance of this system will produce precisely the symptoms observed in Graves's disease; they are consequently due to sympathicotonia. The symptoms are as follows: cardiovascular disorder, viz., tachycardia with slight hypertension; ocular phenomena (tendency to exophthalmia, mydriasis); nervous phenomena, such as sensations of heat, insomnia, tremor, disturbed oculocardiac reflex; decreased salivary secretion, positive Goetsch reaction, increased basal metabolism, provoked hyperglycemia.

VAGOTONIC SYSTEM.

The vagotonic system consists of two portions; a, cranial, which originates in the area of the cerebral peduncles and medulla, and transmits its influence through some of the cranial nerves, and b, a pelvic portion which originates in the lower portion of the spinal cord and is distributed in the lower portion of the abdomen. Its symptoms are bradycardia, which can be modified by atropine, which accelerates the heart; amyl nitrite and ocular compression, which slow up the heart beat; dyspnea; gastralgia; increased peristalsis; constipation; salivation; pupillary contraction. Pilocarpine produces these symptoms. Atropine, on the contrary, depresses the vagus and amyl nitrite and adrenalin excite the sympathetic.

In normal health both opposing systems are constantly at work, they are uninterruptedly under the influence of various stimuli and according to the predominance of one or of the other, the resultant will give corresponding predominating phenomena. This is the reason for the diversity of manifestations in pathological states—the contradictory conditions met with are apparent only, depending upon the character of the excitant and the organ involved.

The present methods of treatment of Graves's syndrome are either medical or surgical.

MEDICAL TREATMENT.

Diet and hygiene.—First of all, dietetic and hygienic measures are of considerable importance. Excitants of the nervous system must be prohibited, namely, alcohol, tea, and coffee. Food producing the least amount of toxic material, such as milk, is the most appropriate. Physical exertion must be avoided and a prolonged rest in bed is advisable. Emotional factors are to be removed. Coitus must be reduced to a minimum. Pregnancy should be avoided. Country life is advisable. High altitudes must be avoided. Hydrotherapy is beneficial but extreme temperatures of the water is contraindicated.

Electricity.—Electricity has been used. Erb advises galvanism. The positive electrode is to be placed on the neck between the fifth and the seventh cervical vertebræ, the negative on the goitre. Faradism is used exclusively by Vigouroux. The modern method is galvanofaradism; the voltage current of ten to twenty milliamperes is used first, the positive pole on the neck, the negative on the thyroid. This is followed by a moderate faradic current during ten or fifteen minutes. The positive electrode is placed in the third intercostal space near the sternum on the left, and the negative on the neck. Finally, a very slight current is applied to the eyeglobes, the positive pole to the orbicularis, the negative to the neck. Claims have been made as to the amelioration of the symptoms, especially of the cardiac and of the general nervousness, but I have never observed improvement from electricity.

Opotherapy.—This is another form of treatment. Antithyroid medication was initiated by Gilbert Ballet in 1895. In conjunction with Enriquez (13) he administered the serum of thyroidectomized animals. Their results, as well as those of others, have been uncertain. Whether in Graves's disease one deals with thyroid insufficiency or with an abnormal thyroid secretion, according to some writers thyroid extracts seemed to be indicated. Here again the results of such a treatment varied. In all events, it is advisable to commence the drug with minute doses. It should be altogether avoided in pulmonary, renal, and cardiac organic affections as well as in glycosuria.

Thymus gives contradictory therapeutic results. Pituitary body is sometimes effectual by producing a vasoconstriction of the thyroid bloodvessels leading to a decrease of tremor. Adrenalin, as is well known, increases sympathicotonia. However, Shapiro and Marine (14) obtained very satisfactory results from adrenalin. Quinine being a vasoconstrictor is sometimes very efficacious. It may be associated with ergot, and it may be given in its newer form, namely quinidine sulphate. Sedatives and antispasmodics are advisable, such as bromides, valerian, belladonna, and coaltar products. Although iodine in simple goitre sometimes aggravates the condition, in Graves's disease it gives satisfactory results. It should, however, be given in very small doses at first. Loewy and Zandek (15) give iodide of potash in extremely small doses, viz., .025 to .12 gr. a day discontinuing it as soon as there is a decrease in weight. The maximum dose is twenty drops three times a day of five per cent. solution. The improvement is accompanied by a reduction in the generally increased metabolism. Injections of iodoform and tincture of iodine into the thyroid body have been advised, but they are connected with risk as to suppurations and hemorrhages.

SURGICAL TREATMENT.

Ligation of the thyroid arteries was advised first by Mikulicz, as a preliminary operation for an eventual extirpation of the gland. Kocher ligates first one artery, later the other artery, and finally he excises the diseased lobe.

Thyroidectomy was first advised by Tillaux in 1880, but total extirpation leads to cachexia and myxedema. At this time only partial thyroidectomy is performed and in several séances (Kocher). The parathyroids must be preserved.

Finally, resection of the cervical sympathetic is one of the operations strongly advised by some clinicians. In view of the ever present sympathicotonia in Graves's syndrome one would expect amelioration of symptoms from such a procedure. However, experience has shown that in some cases the operation was followed by permanent trophic disturbances. Herbert's statistics (16) show a mortality of nine out of forty-one cases. Moreover, since the sympathetic system consists of several centres a partial resection will not always answer the purpose.

Leriche (17) advises avulsion of some fibres of the sympathetic, particularly those surrounding the internal carotid. Great difficulties, however, are encountered in finding precisely those nerve fibres which could be incriminated in any given case. On the other hand, the experience of Jonnesco, Faure, and others in removal of the cervical portion of the sympathetic nerve is quite encouraging. It seems that the really rational operation will be the total resection of three cervical ganglions and of the cord uniting them, because the superior ganglion is the source of the ocular filaments and the inferior ganglion is the source of the accelerators of the heart and of the vasodilators of the thyroid.

In view of the fact that partial thyroidectomy combined with a ligature of the thyroid arteries is the operation of choice by some surgeons in certain countries, it is well to bear in mind the contraindications for such an operation. They are cachexia or grave visceral disturbances, marked tachycardia, psychic manifestations, and finally diabetes. A preparatory phase for an amelioration of these symptoms should always precede operative procedures of any kind.

The results of surgical intervention are various—partial or complete successes may be met with as well as failures by all methods.

RADIOTHERAPY.

This is another method of treatment. Weekly applications of x rays to the lateral and median lobes are sometimes useful. Béclère (18) advises continuing applications until the pulse is 80 in the morning hours and until there is increase in weight. The functional disturbances usually improve rapidly, but the thyroid and the exophthalmos are the last to improve. The results are variable. Experiments on rabbits have shown destruction of thyroid elements from x ray applications. Concerning radium, Abbe obtained very satisfactory results in 1905, although the experience of others is somewhat contradictory, and at best the results are not superior to those from x ray applications.

In discussing the treatment of Graves's disease one should always consider the slight and the grave forms. In the former, medical treatment alone may be sufficient. In the grave forms a trial of medications together with dietetic and hygienic rules, hydrotherapy, electrotherapy, and radiotherapy should always be considered and administered, and only in case of absolute failure is surgical intervention in several séances to be undertaken. It is well to bear in mind in all cases the possibility of a luetic etiological factor. A trial with specific remedies is always advisable.

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1812 SPRUCE STREET.

The Physiological and Pathological Importance of the Thyroid Secretion

By H. STANLEY-JONES, M.B. (Lond.),
Southampton, England.

Among the recognized glands of internal secretion the thyroid must, as far as our present knowledge extends, hold premier place. Its influence is evident at all ages of life, and a close study of its activities will repay us well, in whatever branch of medicine we may be interested.

In infancy, in childhood, in youth, middle and old age, we can discover evidence of its function and a study of its influences at each of these periods of life is of great importance to every clinician. Our investigation will not be complete, however, for we ought to extend our study further back into the life history of the individual. We must examine the part played by the thyroid on the growing fetus, the unimpregnated ovum, and finally on the ovaries and uterus of the mother, as well as the spermatozoa of the male.

To begin therefore with the union of ovum with the spermatozoa, where does the thyroid come in here? To answer the query one must introduce a theory of heredity which is not irrational, and which presupposes that in the fecundated ovum are represented all the hormones which the individual will eventually possess. As each impregnated ovum is composed of male and female elements, its hormonic constitution will be derived from both parents. A thyroid deficiency in the female would therefore be reflected in the ovum, and the same applies where the male is concerned, the defect being adjusted where deficiency in one parent is counteracted by excess in the other, or accentuated where both are deficient.

The future individual therefore starts his existence as a cell reflecting the combined hormonic constitution of his parents, and there will be predominating characteristics in the growing ovum and the mature individual in accordance with the predominating hormonic influences brought to bear by either parent. The nutrition of the growing fetus, however, depends on the mother, and here the thyroid of the mother is of the utmost importance. The pregnant mother requires an ample supply of thyroid hormone for the physiological changes which are involved in the development of the fetus. The thyroid hormone is essential for normal growth, and the physiological enlargement of this gland during pregnancy gives evidence of this need.

The presence of a living fetus in the uterus appears to act as a stimulus to the thyroid. It is thus we see young women who, before marriage, were anemic and generally below par, benefit so much by this increased thyroid activity associated with pregnancy. This thyroid stimulation by the fetus would appear to be nature's method of securing that necessary amount of hormone upon which the growth of that fetus so largely depends. The increased thyroid secretion, however, benefits the whole body, as shown by the improvement in health generally.

The fetus may itself exhaust all the available supply of hormone, that is to say, the maternal thyroid may be unable to respond sufficiently to the increased demands, and while the fetus is adequately supplied the maternal tissues may have a deficiency.

We then encounter some of those distressing disturbances associated with pregnancy especially in the early months, such as nausea and vomiting, pyrosis, heartburn and flatulence, salivation and constipation. In later months eclampsia may develop as a result of this thyroid deficiency.

If the amount of hormone is so small that the fetus itself has insufficient then the fetus develops badly and there will be a liability to abortion and premature labor, and possibly malformation of the child. A liberal supply of thyroid hormone is accordingly most essential during pregnancy. The fetus requires it for proper growth and development, the uterus requires it for its own nutrition and expansion and the maternal tissues have need of it to meet the increased demands on them for metabolic purposes. While thyroid deficiency is associated with poor development of the fetus, it is also one, at any rate, of the causes of abnormally sized children. Babies eight pounds and upwards reflect some thyroid defect in the mother. Large children are usually the product of protracted gestation and this again is an indication of indifferent thyroid action. The women, also, who, in spite of the size of the fetus experience protracted and difficult labors, are probably of the same type.

The thyroid has been called the female gland—that is to say it plays a relatively more important part in the physiology of the female than that of the male. That being so it gives us an explanation of why male children at birth are, on the average, larger than the female. The females have had a more generous endowment of thyroid hormone and it naturally follows from this that the female fetus develops in size more normally than the male, and is in most respects a more healthy infant. It is known that male children are more difficult to rear than females.

After birth of the child the problem of the thyroid secretion is just as important as it was before birth, for the infant requires sufficient hormone for physiological growth. Before birth it received its hormone through the maternal blood. After birth it has to obtain it from the mother's milk. Here the importance of the maternal milk comes in. Mother's milk deficient in thyroid hormone means an ill-thriving child. It is probably one at least, of the causes of the mother's milk disagreeing with the child. An infant up to nine months old depends on outside sources for its thyroid hormone. It cannot manufacture it for itself, for, as will be explained later, the thyroid gland depends on certain intestinal bacteria for the elaboration of its secretion, and suitable flora are not present in the child's intestine until it is nine months or more. After this age it can manufacture its own secretion.

The failure of the mother's milk entirely, or its inability to satisfy the needs of the suckling child invariably leads to the employment of cow's milk, fresh or dried. This procedure is often attended by difficulties owing to unsuitability, from varying causes, of fresh cow's milk to the infant's digestion. Milk from certain cows may prove suitable, from other cows it may disagree. Hence the use of socalled nursery milk from selected cows. The problem of the thyroid comes in here again. If the child is unable to secure its thyroid hormone from its mother's milk, it must do so from the substitute, namely, cow's milk. Cow's milk, however, may, and indeed often does, vary in its thyroid hormone content, and children will thrive on this milk, apart from gross abnormalities in the chief constituents, in proportion to the content of the hormone present, or, what amounts to the same thing, its relative iodine content.

Dr. Ewan Waller (1), of Birmingham, a year or so ago, investigating the prevalence of goitre in cows and incidentally in children, in British Columbia, found that the latter were less prone to goitre in the summer months and more liable in the winter. During the summer months cow's milk showed a high content of iodine, but during the winter there was a deficiency.

The question of infant feeding, therefore, has an importance in regard to the iodine or thyroid hormone content of either the mother's milk or its substitute, and this factor, particularly as it affects cow's milk, has been very little emphasized, for it raises the question as to whether the dietetic value of cow's milk could not be improved when shown unsuitable, by the administration of iodine in some form to milking cows.

After nine months old the child is normally weaned. From this onward the child begins to manufacture its own thyroid secretion. Failure to do so leads to a large number of pathological conditions and disturbances of growth.

There are four more or less cardinal signs of defective secretion up to the age of two years—1, adiposity; 2, delayed walking; 3, delayed talking; 4, late dentition. As the child gets older, backward growth and mental retardation become noticeable. This is particularly observable in the various types of cretins. We also find it in such conditions as Infantile myxedema and congenital syphilis.

Tonsils and adenoids and enuresis are products of a mild degree of thyroid deficiency. Children who are poor feeders without apparent cause are often of the same type. Some other minor indications of this deficiency in children are drowsiness, constipation, itching of the skin as a result of sluggish liver, lordosis, undescended testicle, umbilical hernia, and knock knee. Apparently we must add to this list hydrocephalus, for a case of this disease was reported in the *Lancet* of July 22nd last as having been cured by thyroid extract.

The influence of the thyroid on growth and the bodily activities continues up to the period of puberty. With the approach of sexual maturity, and during the whole of sexual life, the thyroid comes more and more into the limelight, and this is especially so in the female, so much so that the thyroid is not without justification sometimes called the female gland. For perfect physiological health the female, even more than the male, requires a good thyroid. If during her period of growth the girl has experienced a poorly secreting thyroid, her sexual organs are likely to be badly developed. She may have a small infantile uterus, inactive ovaries, and her menstruation probably defective or lacking, and she may have dysmenorrhea. The bony pelvis may also be abnormal. The thyroid at puberty acts as a general stimulant to the physiological activities of the ovaries and testicles.

Deficiency becomes evident in such conditions as chlorosis, amenorrhea, and poor circulation. Badly acting ovaries as a result of lack of thyroid stimulation account for many cases of obesity in young women.

The importance of the thyroid to the pregnant woman has already been discussed; indeed during the whole of the reproductive life of the woman a good supply of thyroid hormone is necessary for efficient child bearing. The more children are born the more is it requisite that the thyroid should not fail, for frequent pregnancies put a strain on the capacity of the gland.

At the menopause, when sexual life is becoming dormant, we find the thyroid developing into a condition of instability. The ovarian function lessens, and if the changes in the gland secretion, both as regards the thyroid and ovaries, are gradual, then the climacteric may be passed through without much distress, but where the change of life is more sudden, we find the thyroid unable to accommodate itself to the new conditions, then we have distressing symptoms due to alternations of thyroid activity and inactivity.

After forty years of age or so both in the male and female we note a period of declining physiological activity on the part of the thyroid. For a comfortable and enjoyable old age, both sexes need a continuation of physiological activity on the part of this gland. Deficiency at this period of life involves the production of innumerable conditions of ill health which could be much relieved were the underlying cause appreciated and its ill effects anticipated. Probably this physiological decline in middle and old age is more noticeable in men than in woman. Normal woman starts life with a more generous endowment of thyroid than man. Her thyroid, therefore, lasts longer, the man's thyroid wears out quicker.

Men are more liable to the degenerative changes which are associated with thyroid deficiency, such as aneurysm, arteriosclerosis, high blood pressure, granular kidney and the sequelæ, cerebral hemorrhage.

This is partly accounted for by the greater physical activity of men and to their more generous indulgence in food, alcohol and tobacco. They absorb more toxic products than the thyroid is able to deal with. They put a greater strain on the thyroid than do women.

This brief survey, necessarily incomplete, is sufficient indication of the physiological importance of the thyroid hormone at all periods of life. We have now to consider what is the chemical constitution of this secretion, how it acts and in what way is it associated with pathological conditions in the body.

The active principle of the thyroid secretion is known as thyroxin, the name given to it by Kendall who first isolated it. Chemically it is called thyrooxy-indol and the essential feature of the formula is the presence of an indol group with three iodine atoms. Thyroxin is an iodine compound of indol which is a decomposition product of tryptophan, a constituent of the protein molecule. Indol is split off by the intestinal bacteria, particularly Bacillus coli, and this exchange explains how an infant up to nine months fails to manufacture its thyroid secretion—for its bowel contains hardly any Bacillus coli, and it shows how we depend on these bacteria for the elaboration of an important hormone.

It is to the iodine content of thyroxin that we look when considering the action of this substance on the cells of the body, for it contains sixty-five per cent. of iodine and the test of the value of any thyroid extract lies in its iodine content.

The essential action of thyroid hormone is that of an activator or accelerator. It stimulates all those chemical changes which constitute the normal physiological processes occurring in the cell. Cell activity and oxidation are increased under this stimulus.

When this stimulus is within physiological limits then the changes going on within the cell fulfill the normal physiological requirements of that cell. That is to say the metabolism of the cell constitutes a normal balance between anabolism and catabolism. Herein lies the great importance of the thyroid hormone—its function of stimulating the normal metabolic changes in the cell, and it is when these changes in the cell are deranged that we encounter the varied pathological conditions of which we get clinical evidence every day. These pathological conditions may arise from over stimulation of the chemical changes in the cell or from deficient stimulation brought about by thyroid excess or thyroid failure.

Thyroid excess produces catabolic changes in the cell—the activity of the cell is greatly increased, oxidation becomes excessive, decomposition of proteids proceeds further than normal, calcium, phosphorus and nitrogen are excreted in undue proportions. The result is loss of weight, and raised temperature (owing to excessive oxidation). On the other hand, where the stimulus is lacking, a condition of anabolism is produced, changes in the cell are retarded, protein material is not sufficiently broken down, and the cell accumulates waste material, which it should normally get rid of.

We see thyroid excess well illustrated, clinically, in Graves's disease and thyroid failure in myxedema. Between these two extremes we have a vast number of conditions which have as their basic defect more or less excess, or failure of thyroid activity.

The main clinical manifestations of excess of thyroid are—raised temperature, increased pulse rate, moist skin, general restlessness and excitability, loss of flesh, tendency to diarrhea. It is important to remember, however, that these clinical manifestations are not due merely to the thyroid excess. There is a fairly wide range of thyroid action within the limits of which the clinical signs of excess are not observable. These limits vary according to age and also according to requirements of the body at any particular moment. There is a physiological elasticity in the functioning of the thyroid. Under certain conditions, however, thyroid excess becomes pathological, that is to say it produces many or all of the clinical signs just mentioned. This is very well demonstrated by the experiment of Kendall and quoted by McCarrison (2) in his book on the thyroid gland, who showed that injection of thyroid hormone into a healthy animal's blood does not affect the animal, but when combined with amino acids it produces marked toxic effects. In other words, if you have an active thyroid and a toxemia combined, then you expect severe constitutional reactions.

It is possible to make the further deduction from this experiment, that a toxemia circulating in blood with a poor supply of thyroid hormone will give much less constitutional disturbance than if the thyroid hormone were present in abundance.

A German writer—Fleckseder (3)—recently pointed out that patients with active thyroids, such as those with Graves's disease, are poor subjects for typhoid. Those with normal or deficient thyroid run a mild course. What applies to typhoid undoubtedly applies to acute febrile conditions generally. Fever is a condition of increased metabolism, and there are, according to Aub (4), two glands particularly responsible for the production of fever—the adrenals and the thyroid, and of these the thyroid is by far the more important.

It follows from this that acute febrile diseases will be more common at that period of life when the thyroid is most active. A survey of the age incidence of various acute febrile conditions confirms this. Rheumatic fever is rare after forty; typhoid is commonest from ten to twenty-five years of age; acute phthisis is typically a disease of youth; pneumonia much less frequent after middle life, and many other acute diseases might be quoted in illustration of a similar age incidence. Acute rheumatism is a good example of thyroid excess associated with toxemia, and the heart lesions in this infection are similar to those produced by thyroid excess. Hashimoto (5) administered continuous toxic doses of thyroid extract to rats, and he found that he produced an enlargement of the heart and myocardial lesions of a chronic nonsuppurative nature, practically identical with those found in the myocardium of human subjects suffering from acute articular rheumatism.

Acute phthisis gives evidence clinically of thyroid excess. Its virulence is greatest during puberty and active sexual life—a period of great physiological thyroid activity. If a phthisical patient can be kept alive until after forty then his chances of recovery are great, for he enters upon a period of declining thyroid activity.

There are two diseases seldom associated with thyroid excess but which have a definite connection with it, acute syphilis and acute gonorrhea. Both these diseases are worse in patients with active thyroids and mild in those with deficient thyroids.

Chronic or tertiary syphilis and chronic gonorrhea on the other hand exhibit signs of thyroid deficiency. While salvarsan in the treatment of syphilis is directed to the object of killing the spirochetes, it also has the effect of depressing the thyroid, and if you depress the thyroid you produce a condition unfavorable to the multiplication of the spirochetes in the blood.

If in an untreated case of primary or of secondary syphilis you administer a sulphur preparation such as contramine, or iodide of potassium, both of which stimulate the thyroid, then the disease will become worse, for you are encouraging conditions favorable to the growth of the spirochete.

In tertiary syphilis we find spirochetes disappearing from the circulation and reduced in number embedding themselves in tissues away from the main blood stream and surrounded by fibrous tissue. In this (tertiary) stage of the disease the thyroid is depressed and the spirochete has less favorable conditions for development. It is also in this stage that thyroid stimulants, such as iodide of potassium and sulphur, are so valuable in counteracting the effects of the thyroid deficiency.

Acute gonorrhea equally illustrates the influence of the thyroid on the severity of the symptoms. If this disease is treated merely by irrigations, the importance of the thyroid will be overlooked. Control your thyroid and you will break the back of your disease. Syphilis and gonorrhea are diseases which, in my experience, respond much more effectively to treatment based on recognition of their relationship to thyroidal activity than to the ordinary routine methods.

To understand fully the relationship of the thyroid to acute infections one important fact must be recorded. In thyroid excess there is abnormal loss of calcium from the body, and the importance of this lies in the connection between calcium and immunity. Blood deprived of its calcium loses its immunizing power. If sodium citrate is added to blood, complement will be found much reduced and the leucocytes lose their phagocytic power. Sodium citrate acts by neutralizing calcium. In thyroid excess therefore there is danger of failure of immunity for the reason that calcium is likely to be diminished in the blood owing to excessive excretion from the body.

Now Graves's disease is a typical example of thyroid excess and it is well known how likely acute infections may develop in these patients. They do badly if tuberculosis or typhoid, pneumonia or venereal disease, and indeed any acute infection develops.

Thyroid excess has great significance in regard to septic infections generally.. Septicemia, for instance, becomes of much graver import, when the infecting agent is associated with an actively secreting thyroid.

Acute appendicitis has a more rapid course when associated with thyroid excess. When we come to the nervous system we find the thyroid exerting its influence here also. People with good thyroids are active, bright, cheerful, restless; given a period of hyperactivity of their thyroid they may show signs of over excitability and even mania may develop, Their whole nervous system shows the influence of the overstimulating action of the thyroid hormone on the nerve cells. Graves's disease exhibits the nervous features very well in a mild form. The nervous system, in turn, has a definite influence on the thyroid, and it is important to recognize this influence, for excitements, emotions of all kinds, have a stimulating effect on the activity of the gland. Quietness and rest therefore are physiologically correct treatment in dealing with hyperthyroidism, and is what we universally adopt in all acute infections. To allow excitement makes the disease worse by adding still further stimulation of the thyroid. I have quite frequently seen this very prettily demonstrated in cases of subsiding gonorrhea where the discharge has ceased. Any severe excitement, sexual or alcoholic, or an emotional disturbance such as a bereavement, promptly brings the discharge back again. The importance of rest is particularly evident after parturition. Now during normal pregnancy there is a physiological hyperthyroidism. It is not an excess for the mother and child have use for it. After parturition there is likely to be for a few days an excess, and it is one of the causes of excessive loss of blood where there is no obvious local cause in the uterus to account for it. Complete rest therefore, to allow the thyroid to quiet down, is indicated after labor and is of course universally practised.

There is another feature of thyroid excess which ought to be dealt with. It is that associated with hyperthyroidism; there is an increased sugar content in the blood. This has a particular interest, as it directly associates the thyroid with acute diabetes. The thyroid hormone and the internal secretion of the pancreas are antagonistic. Elevate one and you depress the other. If therefore you get a faulty functioning pancreas as a result of some local infection or otherwise, associated with an overactive thyroid, then the blood sugar is so greatly increased that sugar appears in the urine, and the clinical signs of acute diabetes reveal themselves.

This explains why diabetes is so fatal in the young for it is a period of life during which the thyroid is most active.

Acute diabetes well illustrates the value of rest in cases of hyperthyroidism. If you allow any emotional disturbance to be brought to bear in this disease, then sugar will return or be increased on account of the added thyroid stimulation. Sufficient indication of the importance of appreciating the part played by the thyroid in acute infections has been given. These indications point to one thing: that if you can control your thyroid you can influence the course of your disease to a material extent. Your disease is acute not merely because your infection is acute, but because your infection and your thyroid have combined to make it so.

If we now turn to the opposite condition, thyroid deficiency, we have a state in which the cell lacks the stimulation of the thyroid hormone. We then have stagnation as manifested so typically in myxedema. The whole body is in a condition of sluggishness, mental and physical. The symptoms of myxedema are well known and need not be dilated on. The clinical signs of the minor degrees of thyroid deficiency are of more practical interest because they are to be met with every day. A great number of these manifestations have already been recorded in discussing the importance of the thyroid at different periods of life.

The essential feature of hypothyroidism is the excess of anabolism over catabolism. The body fires, as it were, burn too sluggishly and leave too much clinker. The immediate result is accumulation, but the ultimate result is degeneration. For a cell to be healthy it must be continually renewing itself. The hypothyroid cell does not renew itself sufficiently often. One of the clinical manifestations of hypothyroidism is a persistently low or subnormal temperature. Slow pulse rate is another feature, and cold extremities a third. When we find such clinical signs as these in a patient we administer thyroid extract and we find the symptoms clear up more or less effectively. The thyroid has stimulated the metabolism of the cells, enabled the cell to burn up the accumulated waste products and increased the activity of the cell generally. Temperature and pulse become normal and extremities become warm.

Now thyroid deficiency is generally associated with toxemia of some sort, and by giving thyroid extract to these patients one finds that the toxemia very frequently is overcome. For this reason thyroid hormone is commonly called an antitoxic agent. This is a perfectly justifiable description, for what the thyroid hormone can do for the normal proteids of the body in splitting them up and making them more suitable for the needs of the cell, so also can it split up the foreign proteids or proteid toxins of bacteria introduced from outside. Everyone, however, who has administered thyroid extract has come across cases where they have had to abandon the administration on account of tachycardia, excitability, and perhaps rise of temperature. The explanation of this is clear; you have given more thyroid than the body at the moment can use. The excess combined with the toxic elements to produce constitutional disturbance. It brings us back again to the same problem discussed earlier of an acute infection being due to a combination of toxin and thyroid. It also gives us the hint that when we treat thyroid deficiency by means of thyroid extract we must not forget to remove, as far as we can, any underlying toxemia, which has helped to depress the thyroid. Probably the most common origin of toxic absorption is in the mouth, or intestinal tract. Teeth, tonsils, and nasal passages are obvious delinquents and when the infection can be traced to the bowel the combination of thyroid extract with calomel, grey powder, or any of the numerous intestinal antiseptics, has much greater effect than merely giving the extract alone.

Vaccines, where the organism causing the trouble can be isolated, are frequently useful.

To search for the infecting agent is just as important in thyroid excess as in thyroid failure and indeed in excess and in failure the removal of the toxic influences may and often does remove the clinical evidences of both.

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The Probable Normal and Pathological Physiology of the Thyroid*

By JOHN ROGERS, M.D.,
New York.

I had thought at first of entitling this article The Surgical Neuroses of the Thyroid, surgical implying that the thyroid was an organ which, by viscously overacting, caused trouble and should be extirpated. The neuroses would apply to abnormalities of function of one or more parts of the nervous system for which there were no demonstrable nerve lesions. Neuroses are due to deficiencies or defects in nervous biochemistry. In studying failures and defects in thyroid activity we find striking analogies to vitamine deficiency.

The hyperthyroid neuroses form the chief subject of interest and as this condition is made worse by feeding thyroid we know that the digested thyroid is the same as the normal thyroid product and therefore that the organ should be removed. The symptoms of exophthalmic goitre point to an increase in functional activity of the autonomic or vagus part of the involuntary nervous system. The sympathetic portion of this system is quiescent and clinically shows no sign of being stimulated by the thyroid.

Fifteen years ago I read before a medical society in Philadelphia, a paper on the serum treatment of hyperthyroidism. A man in our laboratory had damaged the kidneys of rabbits by injecting into them an antiserum made from the kidney nucleoproteins. I suggested a similar experiment for the thyroid and tried it out on three patients. The first was a case of acute toxic hyperthyroidism of three or four days' duration, which had appeared without warning. Three doses of serum acted like diphtheria antitoxin. In the second case the patient was cured in one month by two doses, and the third patient also recovered. After experimenting with a large number of cases, however, the treatment was found to be very uncertain and I concluded that surgery was safer and more satisfactory.

Tracing the history of hyperthyroid patients, I find that they begin as a primary failure or hypothyroidism, the hyperthyroid condition developing later. The nervous person has been subjected to a strain too great for the involuntary nerves to resist. There is first a fatigue failure of the autonomic manifested by lack of drive or hypothyroidism; then an added failure of the sympathetic or check mechanism. After the development of hyperthyroidism all the symptoms including exophthalmus are increased by conditions requiring expenditures of energy—nutritional, mental, nervous or physical—but further back in the history there has generally been a stage of headache, constipation, or anorexia. These symptoms with goitre and fatigue indicate hypothyroidism. Thus the majority of these cases begin as hypothyroidism and later the failure of nutrition becomes hyperthyroid, passing through a stage where the two conditions (hypothyroid and hyperthyroid) are mixed.

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I have tested in the laboratory all possible thyroid extracts on animals. With the noncoagulable (alcoholic extract or a hydrolyzed aqueous extract, thyroid residue) I made the following observations on dogs which I injected: 1, vasodilatation; 2, pulse unaffected, in some instances slow; 3, in Pavloff stomach gastric flow was increased five to twenty fold in fifteen minutes; 4, flow of hydrochloric acid stimulated; 5, pancreatic secretion increased ten fold; 6, gastric and intestinal peristalsis stimulated; 7, contraction of longitudinal muscle and uterine muscle stimulated.

I also found that when the vagus was cut above the diaphragm or after the injection of atropine, that is, in conditions where the end plates of the vagus had been destroyed, there was no result after an injection of thyroid.

In like manner, as the thyroid acts so strongly on the vagus, so the sympathetic responds to the adrenal, and in experiments with nucleoprotein and adrenal residue (that part of an aqueous extract which remains after the removal of all coagulable materials) extracts of these glands I found that there was a checking of gastric and pancreatic secretions and a constriction of the circular fibres of the intestine. Adrenalin differs from the extract of whole gland in that it has little or no effect on stomach or pancreas. Since the adrenal extract produces inhibition of the whole gastrointestinal tract, I tried it on the thyroid. An alcoholic or residue extract of the whole adrenal gland given hypodermically to dogs proved violently toxic (thyroid can be given with impunity). When given adrenal nucleoprotein by mouth, however, there was a fifty per cent. gain in iodine in six weeks, while with the hydrolyzed aqueous extract (adrenal residue) the gain was seventy-five to 150 per cent. Analogous to its action upon the stomach and pancreas the adrenals thus seem to inhibit the thyroid, probably through its sympathetic nerve supply. Pure adrenalin, on the other hand, shows no effect upon the thyroid iodine content.

From both experiments and clinical observations it may be stated that all hyperthyroid tendencies are due to overaction of the ends of the autonomic or vagus system, as seen, for example, in the overaction of the gastrointestinal tract and flushing of the skin (vasodilatation). It is therefore reasonable to say that the thyroid acts through the autonomic or vagus and the adrenal through the sympathetic system. From electrical and chemical tests the general functions of the two systems seem to be contrasting. The vagus system activates or drives and the sympathetic system inhibits or checks. Apparently, the thyroid acts by stimulation of the vagus, and so participates in the drive; the adrenal product acts through and upon the sympathetic and so checks. There is no clinical evidence to inform us about hypoadrenalism and hyperadrenalism, but in hypothyroidism and hyperthyroidism the evidence is plain. In the symptomatology of thyroid disorders it is well to think of drive; if there is drive plus goitre, there is hyperthyroidism; if there is lack of drive plus goitre, there is hypothyroidism, in extreme cases myxedema. There are mixed cases in a stage between hypothyroidism and hyperthyroidism and in these the question of operative or medical treatment comes up. This is determined by summing up the amount or lack of drive. If the drive is excessive, e. g., if the patients are too hungry and the bowels move too freely, the condition is hyperthyroid and if it persists surgery is required.

Clinically, there are three points to be considered: 1, the amount of hyperplasia; 2, the distribution of hyperplasia; 3, the location of hyperplasia. There are three types of cases: 1, The typical hyperthyroidism with a symmetrical goitre characterized by irregularly shaped alveoli which may break up to form multiple small alveoli scattered diffusely through the whole gland; 2, a less common type in which one lobe is enlarged and contains hyperplastic alveoli while the other lobe is more or less normal; 3, the toxic adenomata single or multiple. In the last group the single toxic adenoma apparently begins as a hypothyroid condition. The gland becomes congested and there is hemorrhage, followed by a hyperplastic process, multiplication of alveoli and often cyst formation. If the toxic adenomata are cut out and the normal tissue left the patient quiets down to a normal or hypothyroid condition. In the second group, with one lobe enlarged, excision may bring about a cure; the patient may subsequently pass into the hypothyroid stage, becoming weak, tired, pale, with no appetite and no energy. Fatigue may lead to another advance or relapse into hyperthyroidism with the hyperplasia scattered diffusely throughout the entire gland. In the first set it depends upon how many toxic alveoli are left whether the patients recover. In these cases operation is much more hazardous than in the other two types. In such cases it is my practice to ligate all four thyroid arteries in two stages and in a series of five hundred cases I have had a mortality of two per cent. The sum total of my results shows eighty-five per cent. cures. The patients are always treated medicinally after operation, my theory in this procedure is that, as the impulses forcing overaction come through the blood or nerves or both and as the chief influence is through the blood, cutting off the blood supply will quiet the activity of the gland and this with medicinal treatment effects a cure. I urge the use of this method in view of the probable development of hyperthyroidism from the hypothyroid condition and also because there is no way of determining how much of the hyperplastic gland can be removed surgically without permanently losing drive or failing to cure the hyperthyroidism. As to surgical technic, ligation of the superior thyroids causes pain for two or three days after the operation, while ligation of the inferior thyroids is not only more humane but safer because of the absence of postoperative pain which increases the reaction. This latter is accomplished by section, posterior to the sternocleidomastoid muscle in front of the scalenus, passing beyond the great vessels by reaching the inferior thyroid artery as it leaves the thyroid axis. There is practically no pain and consequently the reaction is less than in ligation of the superior thyroids.

The medical treatment is extremely important and every surgeon should see that it is properly carried out after operation. In our experiments with feeding the desiccated whole gland (made by three of the best known manufacturers) to dogs which were thyroidectomized or had the thyroid transplanted into the spleen (to "denervate" it) this desiccated thyroid produced albumin or glucose or both in the urine within two or three days. Preparations made from fresh thyroid, which are now generally available like the thyroid nucleoprotein material or the thyroid residue, which can be given hypodermically, seemed on the other hand entirely "nontoxic"—clinically these "fresh" derivatives are far preferable to the usual dried powder or tablets. I have found it best to feed the nucleoprotein derivative or thyroid residue to overcome the hypothyroidism and prevent reversion to the hyperthyroid state. If too much drive persists, that is, if the patient is sweaty with too much gastrointestinal or vasomotor drive, feed adrenal extract preferably the adrenal residue (not adrenalin) to check the gastrointestinal disturbance and help the thyroid hold iodine. The hyperthyroid gland seems unable to hold or to metabolize a normal amount of iodine. In postoperative, acute exacerbations, or when immediately after operation the patient manifests lack of drive and high temperature, I have saved some patients by giving hypodermically twenty-five or thirty minims of thyroid residue every four to twelve hours. The alveoli in the glands in fatal cases are filled not with colloid but with a mass of cells and granular material. The skin and tongue are dry and the symptoms are those of failure of the gastrointestinal tract. If the condition lasts long enough the liver enlarges and there is jaundice. The thyroid residue experimentally stimulates the gastrointestinal drive and so when this fails, as it does in postoperative exacerbations of hyperthyroidism, the thyroid residue is beneficial. It slows rather than accelerates the heart.

In closing, as a suggestion concerning the physiology of what happens in these cases, I believe the condition is due to a disturbance of body chemistry more complex in its nature than too much thyroid secretion. There seems to be too little. Death is apparently due to a failure in the nervous and chemical balance which constitutes the automatic drive and check system regulated by the involuntary nerves.

177 East Seventy-first Street.

Results of Treatment in One Hundred Consecutive Cases of Hyperthyroidism

By HUGO A. FREUND, M.D.,
Detroit.

During the past few years unusual interest has been manifested in the study of diseases of the thyroid gland. Following the work of Kocher, Marine, Plummer, *et al.*, investigations concerning the etiology and treatment of diseases of the gland have naturally increased. This interest has been heightened in the past few years by the work of Du Bois in calorimetry and by the simplification of methods for study of basal metabolism by Benedict. These have been of especial value in stimulating studies in hyperthyroidism. Hence, the present time finds clinicians quite generally applying these methods of investigation in their routine hospital and private practice.

The original observations of Parry, Flajani, Graves and Basedow were accurate descriptions of exophthalmic goitre. Though Parry's writings are the earliest, the disease is generally known under the name of Graves's and of Basedow's disease. The syndrome that falls under these titles has been accepted as categorically descriptive. There has been no differentiation of types of the disease. In 1893, Greenfield reported histological changes in the thyroid that he considered the cause of hypertrophy of the gland as well as the basis for symptoms of the disease. Marine had previously called attention to cases of exophthalmic goitre in which not all of the signs were present, but in which a few were effaced, the remaining ones being just sufficient to permit of recognition of the disease. He called these cases the *formes frustes*. Some designated them as secondary types of goitre. Others had described them under captions of indefinite forms of nervous disease. In the meantime, various writers added minor details to the description of the exophthalmic goitre, notably, Moebius, Graefe, Gauthier, Stellweg, Jellinek, Dalrymple, and Buschan.

Following the opinion of Moebius, most observers came to regard exophthalmic goitre as due to hyperactivity of the thyroid gland. This hypothesis, though finding much in its favor, did not account completely for all the changes wrought by the disease. For example, thyroid feeding produces many of the signs of thyrotoxicosis, although exophthalmos does not develop. Though experimental thyroprival myxedema in the sheep is symptomatically the antithesis of hyperthyroidism, the administration of the serum of these thyroidectomized animals does not eliminate the symptoms of exophthalmic goitre. Evidently other factors besides pure hypersecretion of the thyroid are essential to the production of the signs and symptoms of hyperthyroidism. Kocher and Crotti called attention to the part played by the thymus gland. The effects of the disease upon other glands of internal secretion have been frequently observed. Cramer and Krause showed the action of thyroid substance upon the demobilization of glycogen in the liver. Cannon demonstrated the effect of changes of parts of the sympathetic nervous system upon the thyroid. These then are among the observations that have proven that hypersecretion alone is not the sole factor in producing the complete syndrome of Graves's or Basedow's disease.

Studies in the pathological alterations in the hyperthyroid gland following Greenfield's description in 1893 have been notably those of Kocher, MacCallum, Lewis, Wilson, and Marine. Plummer in 1912 was the first to maintain that a specific change existed in the exophthalmic goitre. He pointed out a parenchymatous hypertrophy and hyperplasia of the gland. This he considered an entity in contradistinction to the thyroid adenoma, which may or may not produce an excessive secretion with symptoms of hyperthyroidism.

He states further that the symptomatology of the two conditions is different. 1. In the hyperplastic goitre, exophthalmos is relatively frequent; it rarely if ever is seen in the adenomatous type. 2. The time of life that the goitre developed is earlier in the hyperplastic than in the adenomatous type. 3. The average rate of onset of symptoms following the initial appearance of the goitre is far more rapid in the hyperplastic than in the adenomatous gland.

At the same time points of similarity between the two types of the disease were pointed out: The tremor, the tachycardia, the nervous manifestations, sensitiveness to epinephrin (Goetsch), skin changes and heat production. The latter is of additional importance because as we know, it serves as the means of determining the severity of the disease. This is the one constant outstanding feature of the disease. And it is only in the last few years that the importance of this fundamental point has received adequate study and emphasis. Though Friedrich Müller in 1893 showed that the Basedow patient lost weight and nitrogenous substances on an adequate diet, Magnus Levy in 1895 established the fact that the energy requirements in exophthalmic goitre are increased from fifty to seventy per cent. above the normal. In 1916 DuBois's studies followed by the work of Benedict, Boothby, Sandiford and others, showed that the determination of the basal metabolic rate is the most reliable index of the presence of hyperthyroidism, the severity of the disease, and the progress of the condition as influenced by various forms of treatment.

Since 1917 numerous writers have reported their observations in diseases of the thyroid gland. Their work has been directed toward the problem of more satisfactory therapeutic measures. Surgery, though having made great progress, has not definitely met and overcome all the conditions presented in the disease. Even at this time the most enthusiastic supporters of lobectomy and ligation frankly confess that not all the indications for cure have been met, by reducing the vascularity and by excision of the parts of the diseased gland.

Naturally nonsurgical methods have been suggested from time to time. A great variety have been recommended. Chief among these measures have been prolonged rest, the x ray, radium and internal medication. This has finally led to attempts to rationalize therapeutics and particularly to place the true value upon any procedure. The study of hyperthyroidism by controlling progress with basal metabolic studies has made this possible. Those who have studied the problem from this viewpoint are notably Melans and Aub, Janney, Grier, Lueders, McCaskey. They have pointed out the practical value of the management of hyperthyroidism by nonsurgical methods when controlled by studies in basal metabolism.

During the past two and a half years the material which forms the basis of this paper has been carefully collected for study. The patient of the last case of this series was seen September 1, 1921, so that at least six months has elapsed since any of them were under treatment or observation. This has allowed for a reasonable time to elapse during which failures in treatment and relapses so often observed could have taken place. There are one hundred cases manifesting various types and degrees of hyperthyroidism. They fall, broadly speaking, into three groups: 1, the functional; 2, the adenomatous; 3, the hyperplastic.

Group 1 constitutes those cases in which the symptoms of thyrotoxicosis are mild or moderate. The thyroid is slightly enlarged or in some instances no appreciable change is noticeable. Loss of weight, fatigue, tremor and palpitation are complained of. Eye signs are absent. Sleeplessness, irritability, fears, depression, flushing are among the nervous manifestations. Such patients are rarely if ever prostrated. Sometimes they are more active than usual as if reacting to constant stimuli. Diarrhea and other gastrointestinal symptoms are rare. Menstrual disturbances are often present. Trophic changes are never seen though vasomotor phenomena are frequent. In every case the basal metabolism is increased.

The etiological factors of this group of cases are as numerous as they are varied. Focal infections without producing active thyroiditis are the cause of many cases.

There are twenty-three cases in this series. Puberty is the inciting factor in a certain number, overaction of the thyroid occurring before the proper balance has been established. The climacteric for a like reason may be held responsible for eleven cases. Fright and shock, such as have been produced experimentally by Cannon, definitely account for four cases. Then there are a few cases in which gastrointestinal disturbances play a rôle. These are an indefinite class of cases. Chronic constipation, perhaps cecal stasis, may be the factors. The mechanism is certainly in doubt. Whether it be due to absorption or reflex through irritation of the abdominal sympathetic, no statistics or data cover the question. It is out of this functional group that further differentiation will doubtless be made in the future and it is probable that in some instances the causative factor will be determined.

Of the second group of cases that I wish to speak a history of previously existing enlargement of the gland is always to be obtained. This swelling of the gland may have been present for many years and caused no disturbance other than local irritation or pressure. One of two things may occur. Suddenly following some inciting cause, such as an infection, an injury or fright, symptoms of thyrotoxicosis are ushered in with more or less secondary manifestations. In this the causes are not in any sense different from the functional group, except that an adenoma has been definitely present. However, adenomas become active frequently without any discoverable excitant. In these the symptoms are quite intense and resemble, in many features, the hyperplastic type of goitre.

In the majority of cases of adenoma, however, the onset is slow and gradual. Loss of weight may be the first thing to be noticed. Restlessness may soon follow with trembling and some breathlessness on exertion. This is attributed to a sense of palpitation which increases the patient's anxiety and often produces sleeplessness. Then comes a feeling of continual warmth, the bedclothes are too heavy, the rest of the family seem to need more covering or clothing than the patient. Gastrointestinal symptoms, if any, are usually excessive appetite. If the disease progresses the circulatory system suffers chiefly. The heart hypertrophies, extrasystoles develop and hypertension soon supervenes. The end result may show myocardial degeneration with edema and failing.

The most severe cases of hyperthyroidism from the point of view of the acuteness and the intensity of symptoms are the hyperplastic group. Though the syndrome developing upon the basis of an adenoma may progress so far as to damage irreparably a circulatory system and leave the patient a hopeless invalid, the hyperplastic patient usually seeks relief before the heart or the vascular system has been as severely damaged. In these patients the tremor is coarser and tachycardia is more violent; sweating and vasomotor symptoms are marked; exophthalmos with attendant ocular manifestations—Graefe, Stellwag, Moebius signs—are the rule, gastrointestinal symptoms of nausea, vomiting and diarrhea are common, emaciation is rapid and the thyroid is highly vascular as evidenced by thrills, bruits and pulsations. The onset of this group of thyrotoxicoses is difficult to explain. The pathological picture is something different than occurs in any other known disease. In some glands areas of small round cell infiltration are seen that suggest that the disease is either the result of an infection or the reaction to one. In others the hyperplasia almost reminds one of the tendency to malignant proliferation that is seen in a deciduoma. The physiological response in this type is intense. The metabolic rate is always greatly augmented. There is often a period in the course of a particular case during which severe exacerbations occur. In cases of this type that become chronic there frequently develop trophic changes in the skin or the hair and nails, or other signs attributable to secondary endocrine disease are manifested.

Before we turn to the consideration of treatment in these three classes of cases a word should be said regarding the similarity of some of the individual findings in the three groups. Tremor, tachycardia, weight changes, vasomotor phenomena are common symptoms. To these should be added sensitiveness to epinephrin, increased heat production and lymphocytosis. The Goetsch test is of undoubted value though it is not without danger especially in cases of cardiovascular disease with hypertension. There has been one sudden death from it in my observation. The study of the basal metabolic rate is a method of precision and refinement that not only differentiates the hyperthyroid case from the neurocirculatory case, and the tuberculous patient but also is the means whereby the treatment can at all times be under accurate supervision. I may mention here that the total and differential white count is too frequently neglected as it gives valuable information. Neutrophilic leucopenia with absolute as well as relative lymphocytosis is the rule.

The basis underlying the treatment of hyperthyroidism demands a reduction in the increased metabolic rate that is producing the loss of nitrogen through increased tissue destruction and the exhaustion of the nervous system through the effects of the toxin upon the sympathetic system. Where the primary etiological factor that has activated the thyroid mechanism cannot be sought out and removed, direct attack must be made upon the thyroid structure and upon the thyroid function, so that these may be brought within their normal limits. Naturally where thyroid dysfunction has been found to be due to an increase of thyroid tissue, such as we see in the adenoma and in the hyperplastic gland, surgical methods that will make the proper quantitative reduction have long been advocated and employed. However, for various reasons surgical intervention has not always been possible, expedient or successful. The simple procedure of rest alone has often so reduced the patient's increased metabolism, as to restore a normal function to the gland. Then, too, there are drugs, mostly sedatives, which have had their advocates. Of all of them but one has really deserved attention, because its action is on a rational basis. I refer to the quinine salts—originally urged by Forchheimer for its value in hyperthyroidism in the form of quinine hydrobromide. Pharmacologists have long pointed out that quinine definitely lowers the metabolism. With modern methods of studying the basal metabolic rate, it is an interesting experiment to see how the basal metabolic rate may be reduced by the administration of this drug. Hence, there is a rational basis for the use of quinine salts in the treatment of hyperthyroidism. In my cases, it has been uniformly given as a part of the treatment with satisfactory results.

Ever since the destructive effect of the röntgen ray has been recognized, it has been used in one form or another in the treatment of thyroid disease. Its valuable effects have been recorded at various times. However, only within recent years has a systematic study of such cases been pursued. The controlled use with definite dose of the x ray has made such studies statistically reliable. Checked up by frequent basal metabolism studies, its effect can be so carefully observed that it forms a method of treatment both safe and simple. My conclusions from its use in one hundred consecutive cases, which have been under observation for from six months to three years, are that in the majority of cases it promptly and effectively destroys portions of the gland producing thyroid hyperactivity; that failure to give complete relief does not interfere with subsequent surgical removal of large, hypertrophied, adenomatous portions of gland and that its control places its value as a remedial agent, far above the surgical method of removal of uncertain amounts of the diseased gland.

CONCLUSIONS.

1. It has been the object of this paper to differentiate the three groups of hyperthyroidism, the functional, the adenomatous and the hyperplastic.

2. They can be divided into these types clinically without difficulty if one obtains a careful history of the onset of goitre, the beginning of symptoms, examining the thyroid critically and noting the eye signs and the cardiovascular system.

3. Transition forms are not infrequent and should be definitely considered. It must be borne in mind that there are cases in which there are outspoken signs and symptoms of hyperthyroidism, without glandular changes, or at the most, colloid goitres without adenoma or hyperplasia. These are due to temporary functional hypersecretion.

4. The medical treatment of the hyperthyroid cases with x ray controlled by metabolism studies, proper rest and the use of quinine is a satisfactory manner of managing a great proportion of cases of hyperthyroidism.

5. The results are apparently permanent and where slight reductions have a tendency to occur, the institution of supplementary treatment suffices to arrest the progress of the disease.

2407 WOODWARD AVENUE.

Comparison of Basal Metabolic Rate with the Histopathology in Thyroid Dysfunction

By JAMES B. RUCKER, JR., M.D.,

Toledo, Ohio.

In seventy-five cases coming under the surgical care of Dr. S. J. Waterworth at the Clearfield Hospital, Clearfield, Pa., during the period from June 1, 1921 to July 1, 1922, in which subtotal thyroidectomy was resorted to, microscopic sections have been made and examined histologically. The histological diagnoses have been charted in a comparative way with the basal metabolism of the patients before operation in an attempt to determine whether there existed any relation between the basal metabolism estimation and the several histological types of thyroid dysfunction.

All determinations of the basal metabolism of these patients were made with the large Sanborn-Benedict apparatus.

We notice in these cases in which only the histopathological diagnosis of follicular distention was made, a basal metabolic rate ranging from minus one to plus 211. With the exception of two, however, which showed clinically great toxicity, we may safely say that ordinarily these cases of colloid goitre presented a basal metabolic rate ranging from a normal to a moderate hypermetabolism. This corresponds closely to the clinical symptoms as seen in colloid goitre in which there is apparent, as a rule, little evidence of toxicity.

Follicular distention associated with adenoma gives a very moderate hypermetabolic rate, and here also we note clinically very few toxic symptoms. The basal metabolism ranges in our series of cases from plus eighteen to plus twenty-six.

Among the purely adenomatous conditions as determined grossly and from histopathological examinations, we found the metabolic rate ranging from a plus eleven and plus fifteen, slightly above normal, to a severe degree, plus seventy-one, the usual being from moderate to high. One case of adenoma with sclerosis showed an excessively high rate, plus 103.

In the cases of hyperplasia of the follicles in association with hyperplasia of the follicular epithelium, the range of the basal metabolic rate was between a moderate and a very high degree, depending largely upon the amount of hyperplasia of the follicular epithelium. Rest in bed for six weeks before operation reduced the basal metabolism in one of these cases from plus eighty-nine to plus thirty-three.

In the cases of adenoma with which follicular hyperplasia was associated, we found the range of metabolic rate between minus twenty-nine and plus eighty-seven. From plus twenty-five to plus seventy-five however, would include the usual run of these cases of adenoma with follicular hyperplasia.

In the series were three cases in which there appeared such an extreme degree of follicular and epithelial hyperplasia as to present grave suspicion of malignancy, although the basal metabolism showed but a moderate rate. In the first case three tests were made, one before rest in bed for three weeks which read plus eighty-eight; the second after three weeks in bed and before ligation reading plus fifty-two; and the third, after bilateral ligation of the superior thyroid arteries being plus forty-four. The other two cases of this group gave a basal metabolic rate of plus thirty-six and plus forty-eight respectively.

Four apparently normal thyroids, as far as could be determined by gross and histological examinations, gave basal metabolic rates of plus five, seven, eight and fourteen, respectively, which are all within the normal limits.

The conclusion that one would naturally draw from this brief summary of seventy-five cases of thyroid dysfunction, is that the histological type of thyroid disorder cannot be prognosticated by determining the basal metabolic rate alone and, although the basal metabolic rate and the toxicity of the patient correspond very closely, yet by neither one nor the other alone can the histological picture be prejudged.

Comparative tables are appended herewith, one showing how the cases having the same grouping according to the basal metabolic rate vary in their histological characteristics; the other, in which the cases are grouped according to their histology and setting forth the marked variation in the metabolic rate.

TABLE 1.

1.	E.K.—Follicular hyperplasia and adenoma	—29
2.	C.G.—Follicular distention	—1
3.	J.A.—Follicular hyperplasia and adenoma	+2
4.	H.W.—Normal thyroid	+5
5.	R.H.—Normal thyroid	+5 and +8
6.	C.S.—Normal thyroid	+7
7.	M.K.—Follicular distention only	+4
8.	H.R.—Follicular distention only	+4
9.	C.W.—Follicular distention only	+11
10.	M.McC.—Pure adenoma	+11
11.	C.K.—Follicular hyperplasia and adenoma	+11
12.	M.N.—Follicular hyperplasia and adenoma	+12
13.	L.R.—Follicular hyperplasia and adenoma	+14
14.	M.D.—Follicular distention and adenoma	+14
15.	L.G.—Normal thyroid	+14
16.	R.T.—Follicular hyperplasia	+15
17.	A.M.—Pure adenoma	+15
18.	R.F.—Follicular distention only	+16
19.	A.M.—Follicular hyperplasia and adenoma	+16
20.	H.L.—Follicular distention only	+16
21.	A.G.—Adenoma (endocarditis)	+17
22.	L.C.—Follicular distention and adenoma	+18
23.	H.R.—Follicular distention only	+19
24.	M.L.—Follicular distention and adenoma	+20
25.	E.B.—Pure adenoma	+20
26.	M.P.—Follicular distention and adenoma	+21
27.	R.F.—Follicular distention only	+21
28.	D.T.—Follicular distention only	+21
29.	I.S.—Follicular hyperplasia	+21
30.	M.G.—Follicular distention only	+24
31.	J.H.—Follicular distention only	+24
32.	H.D.—Follicular hyperplasia	+25
33.	F.B.—Follicular hyperplasia and adenoma	+25
34.	A.A.—Follicular distention only	+26
35.	A.W.—Follicular distention only	+26
36.	J.L.—Follicular distention only	+26
37.	M.B.—Follicular distention and adenoma	+26
38.	A.C.—Follicular hyperplasia (marked)	+26
39.	B.B.—Follicular hyperplasia and adenoma	+27
40.	R.D.—Follicular hyperplasia and adenoma	+27
41.	L.F.—Follicular distention only	+28
42.	O.W.—Follicular hyperplasia	+28
43.	H.P.—Follicular distention only	+30
44.	S.E.—Follicular hyperplasia and adenoma	+51, +49, +30
45.	O.A.—Follicular hyperplasia and adenoma	+32
45.	O.A.—Follicular hyperplasia and adenoma	+32
46.	C.B.—Follicular hyperplasia only	+33
47.	A.R.—Pure adenoma	+33
48.	M.M.—Follicular hyperplasia and adenoma	+35
49.	L.M.—Follicular hyperplasia (suspected malignancy)	+36
50.	M.P.—Follicular hyperplasia only	+38
51.	G.B.—Follicular hyperplasia and adenoma	+40
52.	M.B.—Follicular distention only	+41
53.	F.W.—Follicular hyperplasia (suspected malignancy)	+88, +52, +41
54.	J.W.—Follicular distention only	+41
55.	A.K.—Follicular distention only	+42
56.	M.K.—Follicular distention only	+43
57.	M.L.—Pure adenoma	+43
58.	J.E.—Follicular hyperplasia (suspected malignancy)	+48
59.	M.S.—Follicular distention only	+49
60.	E.W.—Follicular hyperplasia only	+51
61.	R.C.—Follicular distention only	+52
62.	J.P.—Follicular distention only	+53
63.	F.H.—Follicular distention (before and after ligation) Very toxic.	+211, +54
64.	A.N.—Follicular hyperplasia (before and after rest and ligation)	+93, +83, +55
65.	J.W.—Pure adenoma	+60
66.	M.D.—Follicular hyperplasia and adenoma	+63
67.	G.P.—Pure adenoma	+64
68.	J.S.—Follicular hyperplasia and adenoma	+65
69.	L.M.—Follicular hyperplasia only	+66
70.	M.M.—Pure adenoma	+67
71.	R.A.—Pure adenoma	+71
72.	M.N.—Follicular hyperplasia and adenoma	+78, and +74
73.	C.B.—Follicular hyperplasia only	+89
74.	M.M.—Adenoma with sclerosis	+103
75.	A.McK.—Follicular distention (very toxic)	+133

TABLE 2

Follicular Distention Only

C. G.	—1
P. I.	+4
C. W.	+11
R. F.	+16
H. L.	+16
D. T.	+21
M. G.	+24
J. H.	+24
A. A.	+26
A. W.	+26
J. L.	+26
L. F.	+28
H. R.	+30
J. W.	+41
M. B.	+41
A. K.	+42
M. K.	+43
M. S.	+49
R. C.	+52
J. P.	+53
F. H. (Before and after ligation)	+211 and +54
A. McK.	+133

Adenoma with Follicular Distention

M. D.	+14
L. C.	+18
M. L.	+20
M. P.	+21
M. B.	+26

Pure Adenoma

M. McC.	+11
A. M.	+15
A. G.	+17
E. B.	+20
A. R.	+20
M. L.	+43
J. W.	+60
G. R.	+64
M. M.	+67
R. A.	+71

Adenoma with Sclerosis

M. M.	+103

Normal Thyroids

R. H. (Before and after resting)	+5 and +8
H. W.	+5
C. S.	+7
L. G.	+14

Follicular Hyperplasia Only

R. T.	+15
I. S.	+21
H. D.	+25
C. B. (After six weeks' rest)	+89 before, reduced to +33
M. P.	+38
E. W.	+51
A. N. (Before and after rest and after ligation)	+93, +83, +55
L. M.	+66
A. C.	+26

Adenoma with Follicular Hyperplasia

E. K.	—29
J. A.	+2
C. K.	+11
M. N. (Before and after rest and ligation)	+78, +75, +35, and +12
L. R.	+14
A. M.	+16
F. B.	+25
B. B.	+27
S. E. (Before and after rest)	+51, +49, and +30
R. D.	+27
M. D.	+63
J. S.	+65
H. S.	+87
O. A.	+32

Hyperplasia with Suspicion of Malignancy

F. W. (Before and after rest)	+88, +52, and +41
J. E.	+48
L. M.	+36

1227 Sylvania Avenue.

The Goitre of Adolescence*

By JEROME SELINGER, M.D.,
New York,
Assistant Professor of Surgery, New York Post-Graduate Medical School and Hospital.

In attempting to classify the various types of enlargement of the thyroid gland certain difficulties will be met when one aims to have the pathological and clinical classifications agree. This discrepancy, of course, implies that we have not yet perfected our analysis of this very interesting gland. The classification given below (1) is as nearly complete as is possible with our limited knowledge.

- I. Goitre with hyperthyroidism.
  - a. Goitre of adolescence.
  - b. Graves's disease.
  - c. Adenoma.
- II. Goitre without hyperthyroidism.
  - a. Simple or colloid goitre.
  - b. Adenoma.
  - c. Various degenerative forms.
- III. Malignant goitres.

The goitre of adolescence is often included in the group known as colloid goitres. Such a classification is chemically correct, for the colloid content of the gland is undoubtedly increased. However, the usual goitre of adolescence presents such an interesting picture and follows such an interesting course that it may be well to describe it as a distinct entity.

It is not the purpose of this paper to discuss either the physiological or the pathological anatomy of this condition. For such an exposition one is referred to the standard textbooks on the subject or to the various exhaustive papers of Kendall, Plummer, and others, which appear at frequent intervals in the various medical journals. It is sufficient to say that in the early stages of this disease, before it is generally recognized,, the colloid content of the gland is decreased. Later, of course, it is increased, and the acini within the gland are dilated, lined with low, flat epithelium, and filled with this colloid material.

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*From the surgical service of Dr. Charles Gordon Heyd.

Diseases of the thyroid gland occur throughout the world. There are certain areas, however, called goitre districts or goitre belts where the disease is much more prevalent than in adjoining regions. The Himalayas and the Alps are the most important goitre districts on the Eastern Hemisphere; the Great Lakes Basin and the Cascade Mountains of Washington and Oregon are the most important ones on the Western Hemisphere. Goitre appears to be on the increase and they are found in large numbers in districts far removed from the socalled goitre belts, districts that at one time were thought to be immune.

Because of its accessibility, the thyroid gland has perhaps had more study than any other internal secreting organ. In spite of all this research work the ultimate cause of the goitre of adolescence is not known. Its immediate cause has been definitely shown to be due to a deficient amount of iodine. This iodine deficiency is undoubtedly due to a disturbance of the iodine metabolism which, under normal conditions, should maintain an equilibrium. In other words, iodine catabolism exceeds iodine anabolism and a deficit is created. Whether the goitre districts lack iodine in their food, the water or the air, has not been determined. Ordinary food contains such a negligible amount of iodine that it need hardly be considered. Furthermore, an analysis of food in goitrous districts has shown it to be on a par with food grown where goitre is almost unknown.

That goitre is a water borne disease is a theory almost as old as the disease, and it cannot be cast aside as being unsound. Iodine is derived originally from the sea and the goitre districts are all mountainous. There is room for considerable research work along this line.

The thyroid gland contains a very much greater amount of iodine than any other organ in the body. It is, as it were, the storehouse for iodine which it discharges into the circulation by means of the lymphatics as the various metabolic demands of the body may require it. With these facts in mind it has been suggested that the goitre of adolescence may occur in one of two ways. First, normal metabolism in an individual with a deficient amount of iodine; second, increased metabolism in an individual with a normal amount of iodine.

At the beginning of the paper it was stated that goitre is on the increase. In this connection it is interesting to note that a large number of the female population of this generation is engaged in business and other varieties of labor. This is a condition that has not existed heretofore. The body economy of these individuals, as far as we know, is the same as those who have gone before them. But they are living and working under totally different conditions. After a hastily gathered breakfast they rush off in the crowded cars and subways to their work. They are under tension most of the day with a short interval for lunch. They travel home under conditions similar to those under which they came to work. They probably spend most of the evening and night at the moving pictures, dancing or otherwise playing about. An additional noteworthy fact is the preponderance of meat in the diet of these people. In conjunction with these facts, and in some instances because of them, the bowel hygiene becomes bad, the eyes are strained, and the teeth and tonsils become diseased. All these factors tend to produce both nervous and physical exhaustion.

Such a strain upon the body is bound in time to alter the orderly discharge of its duties. An increase in energy demands an increase in metabolism. An increase in metabolism means an increased catabolism of iodine. If under these conditions the body calls for more iodine and it is not forthcoming from the normal gland, then the thyroid must enlarge to furnish it. Girls of this kind can be seen in large numbers on any of the crowded business streets of New York. They represent a distinct type with a peculiar constitutional appearance. They are generally thin, quick, alert, and sensitive with a full or an enlarged neck. They weep easily, have a poor and capricious appetite, sallow skin, complain of constipation and of irregular, scanty and painful menstruation.

It would seem that the enlargement of the gland under these conditions is purely a compensatory one. More iodine is required to supply the needs of the body and the iodine factory and storehouse enlarge to meet the demands.

It may not be out of place to mention here the intimate relationship between the thyroid gland and menstruation. It has been known for centuries that the gland enlarges just previous to the flow. It is also an established fact that the necks of young virgins are larger in diameter than those of women who have had sexual intercourse. In the old days among certain tribes it was customary to measure the bride's neck previous to her marriage and on the morning following it in order to determine whether or not she had had sexual intercourse. (Havelock Ellis.)

In the majority of cases the goitre of adolescence produces few or no symptoms. The patient, usually a female between the ages of fifteen and twenty, informed by a relative or friend that her neck is slightly or considerably enlarged, consults a physician. This enlargement is uniform. On palpation it is found to be soft, of a smooth, even consistency, and without any nodules. This bilateral uniform enlargement may be the patient's only complaint and the sole reason for her consulting a physician.

On the other hand, if the enlargement has existed for a number of years, during which time the patient has continued to live at top speed, then other symptoms make their appearance. She will begin to lose weight, show a poor muscle tone, fatigue easily, become sallow and constipated. She is also nervous and highstrung and has tachycardia upon the slightest exertion. With certain degenerative changes that may take place in such a gland other symptoms indicative of such change are superimposed upon those already mentioned. Such a gland very readily develops into a true toxic goitre or Graves's disease.

In any patient with an enlarged neck it is always important to determine the basal metabolic rate. If it is found to be approximately normal then you may be nearly positive that you are not dealing with a true toxic goitre. The patient with a goitre of adolescence should have a normal or a slightly plus basal metabolic rate. The literature on basal metabolism is still in its infancy. So many factors must be taken into consideration in order to determine a reading that errors are prone to occur. One must allow for these errors when the basal metabolic rate is a determining factor. Lusk has briefly yet completely defined the basal metabolic rate as "the minimum of energy compatible with cell life."

Usually the goitre of adolescence undergoes a spontaneous cure, and after a varying number of years the person is once again normal in all respects. This would appear to be due to the fact that the patient leads a more orderly life and the increased iodine formerly so necessary is no longer called for. The size of the gland is accordingly reduced. An additional factor that tends toward a spontaneous cure is natural biotic retrogression.

Instead of a spontaneous cure the gland may at any time undergo one of the following forms of degeneration: cystic, true colloid, or adenomatous. The calcareous and malignant forms of degeneration rarely occur in early life. These generative forms as a rule produce no symptoms unless they are sufficiently large to exert pressure upon the surrounding structures. It is asserted by some that the adenomatous type of goitre, when present, existed as such originally due to some fetal rests that were encapsulated. These have remained dormant for many years and then have started to grow slowly.

The treatment of the goitre of adolescence is not difficult provided you have the complete cooperation of the patient. The splendid work of Marine and Kimball has conclusively demonstrated that small doses of iodine over a comparatively short period of time will reduce the gland to its normal size. Iodine in any form may be used. Sodium iodide,, for example, given in five grain doses twice daily for a month or two should suffice. If the gland does not become smaller under such treatment the probable indications are that you are not dealing with a simple goitre but with one of the mixed types that are often found in which an adolescent goitre is associated with a small adenomatous growth of the thyroid. When such goitres are treated with iodine the colloid portion generally disappears and the goitre is reduced in size, but the adenoma remains and is then more easily recognizable. (Sistrunk.)

In conjunction with the iodine treatment good hygiene and dietetics must be insisted upon. The patient should lead an orderly life with at least eight hours of sleep each night. The diet should be rich in carbohydrates and the bowels should be moved regularly each day. Too much emphasis cannot be placed upon this latter point for a great majority of the girls of this generation are constipated. McCarrison records some interesting experiments which very closely link intestinal stasis with enlargement of the thyroid gland. He quotes Lane who, in such a case, performed a shortcircuiting of the bowel for the constipation, and the goitre disappeared. His further experiments with the bacterial flora of the large and small intestines deserve considerable attention.

The teeth and tonsils should be regularly inspected and any disease of these structures should be promptly treated. Calcium, being an important factor in metabolic disturbances, will be of distinct benefit if given with the iodine. This latter fact is evident when we realize that in goitre there is true calcium catabolism. It is well known that the thyroid gland exercises an important influence over calcium metabolism. This is probably closely related to other endocrine organs.

The goitre of adolescence is not a surgical condition. To consider an operation upon a gland of this type is worse than failing to consider one for a toxic goitre.

REFERENCE.

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59 East Sixty-seventh Street.

Endocrines in Gynecology

By J. THOMPSON SCHELL, M.D.,
Philadelphia,
Gynecologist to the Northwestern General Hospital.

According to some writers "viewed in a broad sense, every organ and tissue in the body possesses an internal secretory function," for each one gives off to the blood stream one or more substances capable of influencing the organs and tissues far distant in the body. In the case of the socalled ductless glands, the internal secretion is characterized by certain more or less striking and specific effects.

The designation of endocrine organs would seem to be preferable to that of ductless glands, for the function of the internal secretion is not confined to the glands which possess no ducts. According to other writers, the best example of a gland possessing both external and internal secretions is the testis. To the same group belong the ovary, if we look upon the periodical discharge of ova as a species of external secretion.

As this paper is to be confined to the endocrines in gynecology, it will be necessary to review as briefly as possible the modern conception of menstruation, which is based on the belief that the ovary gives off a secretion which is responsible for this phenomenon.

Halban has brought forth evidence, both experimentally and clinically, which seems to point the fact that the ovaries are really only activators to the real underlying cause of menstruation, but his work does seem to prove the ovary is a real factor in producing menstruation, whether directly or indirectly. The impulse starts from the ovary and is carried by the blood stream and is therefore classed among internal secretions or hormones of the body.

There has been much discussion as to which portion of the ovary produces this important hormone, the follicle, the stroma, or the corpus luteum. The evidence seems to point strongly to the corpus luteum. The father of this theory was Gustav Born, and his pupil, Frankel, has placed it on a strongly experimental basis. Dr. J. G. Clark takes the position that the corpus luteum function is to stimulate the blood supply of the ovary.

If it was possible to isolate the active hormone of the corpus luteum and by injecting it into the blood bring about the characteristic premenstrual hypertrophic changes in the uterus, the problem would be solved, but the use of corpus luteum extract either by mouth or by injection has not been altogether convincing. The matter is more complicated by the fact that the function of the corpus luteum appears to vary at different stages of development. The question, therefore, must be regarded as an open one.

No consideration of the physiology of menstruation would be complete without the assumption that there is some local factor in the endometrium which in some way increases the permeability of the bloodvessel during menstruation. This is closely bound up with the question of why menstrual blood is noncoagulable. In the final analysis, however, it seems probable that the formation of this substance, be it hormone or enzyme, is dependent upon the ovary, and may as Sheickel's work indicates be formed in the ovary and given off by the endometrium.

That the ovary is fundamentally important in determining sexual characteristics is sure, but it must be emphasized that other endocrine glands, especially the thyroid and the pituitary, play a very important contributory rôle and that these glands are greatly influenced one by another must always be kept in mind.

To me the literature on endocrinology is not without humor. The more the contributions of various writers are compared the more contradictory the evidence seems. One very enthusiastic writer goes so far as to say that we are nothing but a balance of our endocrine reactions, and it seems to me that it will be only one step into the future to see added to the other socalled schools of medicine that of endocrinopathy, or something like that. Let me call your attention to the words of Sajous: "If our object to place pharmacology on a scientific footing is ever to be realized we should insist, whenever an agent is to be tried therapeutically, upon a preliminary determination of its identity as a chemical body. Thus only will it be possible for us to establish its physiological action on a solid basis. In drug therapy, this important feature has been carried out to a considerable extent, and what we know of the physiological action of most agents derived from plant life has been acquired since their active principles have been isolated and made the basis of experimental and clinical study. Just as opium contains various principles—morphine, apomorphine, codeine, etc.—so do animal extracts contain a multiplicity of substances, cellular and plasmatic, and also products of cellular metabolism capable of provoking physiological effects; but here very little effort has been made to isolate the truly useful principles. Hence, the confusion and empiricism which has always surrounded the use of these agents.

"All this applies to organotherapy as it does to pharmaceutical agents. It is unquestionably true that we have among the twenty and odd animal extracts that have been proposed a few, at least, which are capable of affording relief where no other class of agent will act—thyroid preparations in myxedema and cretinism, and adrenal extractives in Addison's disease and hemorrhage, for example. The adoption of a systematic line of study in the direction proposed seems to me to facilitate the discovery of additional useful applications of these agents, or, at least, to give their use in practice a more rational basis.

"Important in this connection is the identification of the true organotherapeutic preparations. By the true agents I mean those which can be used intelligently, with knowledge of the physiological effects produced for the reason that their active principles are known. Thyroid extract belongs to this class, since we know that its action is due to the iodine in organic combination its secretion contains. Adrenal preparations likewise are included because their active principles, whether epinephrin, suprarenalin or adrenalin, are also known. Conversely, we have a large number of organic preparations that are used blindly, without knowledge of their components, which may number from five to twenty or more, in almost any disease related directly or remotely with the organ from which the extract is obtained. Mammary extract can be cited as an example of these agents. They are hardly entitled to a rank much above that of empirical nostrums until rendered fit, by their sponsors through chemical, pharmacological, and clinical researches, to be taken up by the profession as legitimate pharmaceutical agents.

"When it is remembered that almost any organic substance will in some way or other affect the blood pressure, and when we consider that all tissues contain more or less nuclein, intermediate, and therefore toxic, wasteproducts, red and white corpuscles, and many other substances capable each in its own way of evoking some sort of reaction when injected into animals, the actual value of such experiments is reduced to nil. It is about as scientific as the giving of hashed ear for earache."

No one has, as yet, been able to isolate any active principle from the ovary or really to prove that it manufactures an internal secretion. I have removed the ovaries from women of all ages and in the majority of the cases, so operated upon, I have failed to see the alarming symptoms that have so vividly been described by so many physicians. In fact, I have had much better results by a total removal of the ovaries than I have had by the socalled conservative method, and while I am not in favor of removing the ovaries as a routine procedure in pelvic disease, I fail to see anything but good result following a clean pelvic operation, and I have had many nervous and disappointed patients where a partial ovariotomy had been performed and very frequently have seen second operations become necessary. According to Lowey and Richter, removal of the ovaries reduces the oxygen intake ten per cent., and this may explain some of the postoperative symptoms following double oophorectomies.

My personal experience in the use of ovarian extracts and corpus luteum on the whole has been disappointing and unreliable, and I can never prescribe their use with any real confidence in the results, and the indications for their use are never clear or definite. I have had some really good results in the use of both ovarian substance and corpus luteum in postoperative treatment, following double ovariotomy, and also some fairly satisfactory result in the nervous phenomena of the menopause of climacteric period, but on the other hand I have many cases that have shown no results from the same line of treatment and in fact the symptoms have apparently been somewhat exaggerated. I can hear some expert (?) endocrinologist say that this was due to improper application of the various internal secretions or the wrong combination of endocrines, but be this as it may, I am inclined to think that no one as yet can say just how these various socalled endocrines can be used with a hope of a reliable and definite result, and, as quoted above, until some definite chemical substance can be isolated and studied, the whole subject will continue to be empirical and confused. If the corpus luteum function is to stimulate the circulation, and therefore the activity of the ovary as suggested by John G. Clark, then theoretically corpus luteum would be useless in women whose ovaries had been removed, but I am confident that I have had more and better results from the use of the corpus luteum extract, both by mouth and hypodermically, than I have ever had from the ovarian substance itself.

That endocrinology in gynecology will be increasingly useful is to be hoped for and expected, but let us not be carried away and overenthusiastic on this subject as overenthusiasm is always followed by a reaction that spells therapeutic nihilism.

The future of ovarian substances, hormones or extracts must be worked out by the physiological chemist, placed on real scientific basis before we can hope for an established place for these substances in our everyday therapeusis.

Let us therefore be willing to help by constructive criticism and careful clinical observation, but not to be carried away by improbable and unscientific reports of the overenthusiastic endocrinologist.

2102 Spruce Street.

Present Day Considerations of the Thyroid

By JOHN B. HAEBERLIN, M.D.,

Chicago.

During the past score of years thyroid surgery has been progressing and improving probably more than that of any other organ that is the focus of surgical attention, it being the one ductless gland that has been courted surgically and has up to the present carried away the honors. It is essentially a surgery of helpfulness. Up to the present time surgery for thyroid conditions, especially in adenomatous and hyperplastic types, is sovereign in its results and when performed early in these conditions results in cure in nearly all cases.

Recently the use of radium and the x ray has entered into the treatment of the thyroid, but these are of no value in the thyroid conditions of adolescence or for women during the childbearing period. As yet the dose of x ray and radium is difficult to determine. In their use each rests upon its own merits. After the treatment the progressive hypoplasia and gland degeneration ensuing is uncertain and undetermined in its amount. It therefore may produce an undue amount of damage resulting in myxedematous conditions, also increasing the connective tissue of capsule and cervical fascial layers of the neck making operative procedure more difficult.

At the larger clinics, especially those of Mayo and Crile, there is still a preference for surgery rather than for radium or x ray. This applies especially to adenomatous and exophthalmic types of goitre. During the last score of years the writings or literature on the thyroid have been voluminous and exhaustive. It has taken up especially the hypersecretion of the thyroid. There apparently is a swing of the pendulum to hyposecretion conditions of the thyroid, and it has been thought by many that the hypothyroidal condition is far in excess of the hyperthyroidism. The reason for the general impression that we have hyperthyroidism in excess is because the profession has focused its attention on this condition, and when it is established it is much more easily diagnosed than the beginning hypothyroid condition. The literature abounds in the different types and pathology of thyrotoxicosis along with its symptomatology and clinical signs. The treatment, especially the surgical treatment, has been thoroughly discussed and perfected, but one finds at the present time attention being focused on the prevention of simple goitre. The condition of goitre as it exists in different countries and communities has been recognized as a serious menace to the race. It has been taken up by legislative bodies and commissions appointed to investigate thyroid conditions and recommend treatment in different countries. It was as early as 1848 that the Sardinian government appointed a commission to study the condition of endemic goitre and recommend a method for its relief. France did likewise in 1864. Switzerland in 1908, and later Italy followed with their commissions on goitre. The French commission reported that France had 500,000 goitrous people with 120,000 cretins.

HISTORY.

Paracelsus, a Swiss physician, early in the sixteenth century, emphasized the relation between endemic goitre and cretinism. In 1825 Parry described a goitre syndrome; in 1835 Graves described a clinical complex with exophthalmic goitre; in 1840 Basedow's monograph on the same disease appeared. In 1874 Sir William Gull described a clinical complex of colloid myxedema and associated it with a lack of function of the thyroid gland. In 1880-1881 Kocher and Reverdin described a condition following total removal of goitrous thyroids which was interpreted as myxedema, confirming Gull's investigation in 1874. In 1877 Ord described a condition of subcutaneous mucoid deposition of tissue. This he considered to be a condition of myxedema. Horsley produced experimental myxedema in monkeys. Murray and Mackenzie in 1891 first administered thyroid extract to myxedematous patients and obtained definite therapeutic results. Magnus Levy in 1895 confirmed the findings of Mackenzie in 1891. In 1895 Bauman discovered that iodine was the normal constituent of the thyroid gland. In 1901 Oswald showed that iodine was not free but bound with globulin. In 1907 Marine emphasized that iodine is necessary to the normal function of the thyroid gland, that active hyperplasia of the gland is practically impossible if sufficient iodine is present in the system. In 1915 Kendall isolated an iodine containing hormone in crystalline form which he called thyroxin. The scientific analysis of goitre is distinctly of modern origin. However, goitre has been traced back to 2,000 years B. C. In taking up the historical side of goitre A. Hirsch has given us one of the most exhaustive publications in his *Historical and Geographical Relations of Goitre.*

ETIOLOGY.

The etiology of goitre is at the present time simply a speculation. There are a number of things or factors of which we are positive concerning goitre. The most outstanding factor up to the present time has been brought out by Marine, that it is a deficiency disease. He points out that iodine is essential to normal thyroid activity; from a chemical point of view any substitution for iodine destroys the physiological activity of the thyroid hormone; histologically glandular hyperplasia is due to a deficiency of iodine; the physiological action produced by thyroid extract is always in proportion to the iodine content. In experimentation, if iodine content is maintained above one tenth of one per cent. no anatomical changes toward goitre formation can take place. We have probable etiological predisposing factors in water, seashore and altitude. It is known that geographically considered our goitrous districts are especially removed from the sea shore. Many of our goitrous areas have a high altitude and many others are supplied with a water that is comparatively free from iodine. This apparently corroborates the iodine deficiency theory as a cause of the disease. Another causal factor is infection and it has many followers. McCarrison considers it a water borne infection belonging to the colon group of bacteria, and he has long championed the theory of a gastrointestinal infection as a goitre producing influence. However, he tries to reconcile the iodine deficiency condition by stating that the modified function of the infected gastrointestinal tract interferes with the normal absorption and assimilation of iodine.

Infections at any place throughout the body may produce a reaction in the thyroid producing activity, and in this way we may have the onset of a thyroid toxicity. This is especially true of the exophthalmic type or hyperplastic toxic thyroid. Age is especially a predisposing factor and we know that the adolescent lives through a critical period. The female carries a preponderance of approximately ten to one over the male and this, coupled with puberty, sex activity, pregnancy and menstruation, shows us the reason for its preponderance in the female, the thyroid being essentially a sex gland, so much so that it has been called an accessory ovary by Professor Osborne. Another cause is metabolic variation, this being associated with diet, as shown by the breaking down of glucose tolerance. There may be some balance in metabolism not yet discovered seriously influencing goitre. Heredity is considered by many to be a predisposing factor.

There is no doubt in my mind that different causal factors enter especially as regards the type of goitrous development. In certain exophthalmic types we have infection as the causal factor, the sepsis calling for an increased thyroid activity or a secondary involvement in the gland. We at times find cases which belong to this classification. Again, in the adenomatous types it is thought by many that the nuclei or adenomatous rests are congenital and as the person develops and call is made upon the thyroid these embryonal rests become active. I have had a number of cases in which it seemed certain that the gland developed from embryonal rests and these adenomatous types are especially common in families having a hereditary influence. There probably is no doubt that dysthyroidism in these cases is influenced or modified by one or all of the predisposing factors mentioned previously. These goitrous conditions are also modified by the hormonal balance occurring in the interrelated glands. Of this we have clinical evidence as may be observed by the influence of sex function, menses, pregnancy, and other activities upon the clinical picture in these patients.

Another predisposing factor of goitre is the overcrowding which may exist in rural districts as well as in the urbanized areas. Experiments on fish, performed by the Pennsylvania State Fish Commission during the years 1910-1911, show that goitre can be produced or prevented very definitely, the important factors being the overfeeding with artificial food, and, secondly, overcrowding. These two factors produce goitre in fish. Controls in nongoitrous fish showed that adding small amounts of iodine to the food or water and by remedying the overcrowding goitre did not occur. It has been thought by some that general debility predisposes to goitre also. Sex stimulation which may be of the subconscious type as it occurs in the pubescent years, such as uncontrollable longings, dreams and the like may be important factors. Sex stimulation and activity are associated with hyperemia of the thyroid. This has been especially noted in India. The natives judge from the thyroid enlargement whether their wives have been tampered with. Fright, worry, anxiety, grief are known for many years to be predisposing factors.

CLASSIFICATION.

With the advance of modern pathology of the thyroid gland the old textbook classification was discarded and it summed itself up as to whether we had a hyperplasia or a nonhyperplasia type, and with each of these types we had an atoxic or toxic variety. It was discovered that the clinician could prognose the type of thyroid that was extirpated with the exception of the hyperplastic atoxic type. Hyperplasia in the gland itself means toxicity, and the hyperplasticatoxic types of goitre were found to be very much less than one per cent., or so much so that many clinicians are of the opinion that the hyperplasticatoxic goitre is simply the beginning of the hyperplastic type of goitre before sufficient absorption takes place to produce clinical symptoms. The new classification, that is accepted by nearly all, is summed up clinically as simple or colloid goitre, adenomatous goitre, exophthalmic goitre, and physiological hypertrophy associated with adolescence, menses, pregnancy and allied conditions. This type is practically a forerunner of the simple colloid goitre.

DIAGNOSIS.

Given a goitrous patient the most important thing to determine is whether or not we have toxicity. In well established toxic cases the diagnosis is self-evident and we have in recent years been endeavoring to develop a reaction or technic that will aid us in our borderline cases. The most notable of these are the basal metabolism test, the Goetsch reaction, the Kottmann reaction and others. It would be ideal if we had a laboratory test which would tell or indicate to us the beginning dysfunction of the thyroid. Work along this line has been done by Rogoff and Goldblatt in an attempt to detect thyroid secretion in the blood of patients with exophthalmic goitre and other conditions involving the thyroid. Koopman, in the laboratory of the New York Health Department, has worked out a technic with fresh thyroid glands of dogs and guineapigs titrated against the serum of patients with toxic thyroidism. His idea is to determine toxic thyroids by a serum fixation test. Kottmann, a Swiss physician, has developed a reaction for thyroid activity. His technic consists of certain chemicals added to the blood serum and exposed to a strong electric light. The color changes determine his reaction. William F. Peterson, *et al.* determined that the Kottmann reaction was of value in all but three out of seventy cases of hyperthyroidism. The time will probably come when a laboratory method will be developed that will determine accurately beginning thyroid dysfunction and will be especially valuable in our borderline cases.

The basal metabolism test, if properly interpreted, has been accepted by the profession as having unusual merit and being an accurate index as to thyroid toxicity or activity if properly performed. The value of the basal metabolism test depends upon its correct reading and interpretation. Each case stands on its own findings. The status or physiological condition of the patient should be determined and correlated with the basal metabolism rates taken to determine its rise, fall or fluctuation.

Another valuable functional test in borderline cases is that of glucose tolerance. It is a test valued in diagnosis of mild hyperthyroidism or, in other words, in borderline cases. This has been worked out by Morris, Denis, Aub, Minot. In cases where we have the symptoms and physical findings which are suggestive of hyperthyroidism it is worth a trial.

BASAL METABOLISM.

Increased	*Decreased*
Hyperthyroidism	Hypothyroidism
Hyperpituitarism	Hypopituitarism
Fever	Asthenia
Infection	Especially those associated with myxedema

Nervousness simulating hyperthyroidism gives a negative test for the basal metabolism rate. The basal metabolism test is of greatest value in conditions simulating hyperthyroidism especially nervousness, irritability, heart neurosis and in our differentiation between early hyperthyroidism and neurasthenia. I am convinced that if we can interpret the emotional disturbance properly it will be of great help. A patient with hyperthyroidism is in a state of mental overactivity and there is inability to readjust the mind and the body to a state of repose. In the neurasthenic, on the other hand, any increased effort of mental or bodily activity produces the increased disturbance and exhaustion. The mental state of the hyperthyroid patient is optimistic, of the neurasthenic it is pessimistic. The crying of the hyperthyroid patient is usually without anguish or selfpity; with the neurotic there is usually anguish and selfpity. The irritability of the hyperthyroid patient is generally associated with an optimistic mental attitude while in the neurotic this irritability is associated with gloominess and plaintiveness.

The Goetsch reaction is simply based on the fact that the hyperthyroid patient is susceptible to adrenalin or epinephrin. In the last year the Goetsch test has not been so frequently reported but I believe it has a distinct value in borderline cases. This much we are certain, that in practically all cases its activity and intensity go hand in hand with our basal metabolism test. In a series of eleven borderline cases, in which four turned out to be pseudohyperthyroidism, the Goetsch test was negative in four cases as was also the basal metabolism test; in the remaining seven the basal metabolism and the Goetsch test ran hand in hand.

The thyroxin discovered by Kendall has a definite relationship to the basal metabolism rate. The function of the thyroid gland, so far as it is known at the present time, is the production and storage of thyroxin, and according to Klein is to deal particularly with the catabolism of protein poisons in the body. Another function is in its differentiation of tissues in the growing organism as demonstrated by the difference between the cretin and the normal individual. In conditions where the basal metabolism test is persistently below minus 16 to 20 myxedema develops. In thyroidless persons the basal metabolism rate may be kept normal by the administration of 1.6 milligrams of thyroxin given daily as shown at the Mayo Clinic. The basal metabolism rate should be used repeatedly to determine the effects of treatment, it being an index for determining medical, surgical, x ray or radium treatment.

PREVENTION OF SIMPLE GOITRE.

With the prevalence of goitre in children determined at fifty to ninety-five per cent. (Klinger of Zurich estimating eighty-two to ninety-five per cent., and in this country around fifty per cent.)—the prevention of development has been worked out by Klinger, Marine and Kimball, it being so simple as to arrest our attention and challenge the careless man to activity. Working upon the basis that simple goitre is a deficiency disease, considerable work has been done in this country by Moore, Kimball, Crile, the Mayos, Marine and Lenhart, and in Europe by McCarrison of England and Kocher of Switzerland. Kocher's statistics show eighty per cent. or more of the school children in Berne to be goitrous, coinciding with many of the goitrous areas in this country, and the recent clinical experiments among school children at Akron, Ohio, and elsewhere are confirmative of the work done in Switzerland by Klinger, so that at present the consensus of opinion is that simple goitre, especially in children, is a preventable disease when properly treated.

CONCLUSIONS.

1. It becomes the duty of every practitioner, specialist or general, who in any way comes in contact with children, at least to advise and recommend the proper prophylactic treatment of simple goitre.
2. Well established goitre (adenomatous and exophthalmic) should be subjected to the earliest proper surgical treatment. X ray and radium may be supplemental but should not supplant surgery.
3. It is advantageous to be on the alert for borderline cases, early diagnosis being a great help to the patient. In determining these cases great aid may be derived from, a, the basal metabolism test; b, glucose tolerance; c, adrenalin susceptibility.
4. Goitrous pregnant women should be given the benefit of the known aids concerning its prevalence.

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On the Relation of the Spleen to Metabolism

A Review of the Literature

By JACOB ROSENBLOOM, M.D., Ph.D.,
Pittsburgh, Pa.

INTRODUCTION.

As it has been definitely shown that the removal of the spleen produces a varying degree of anemia, an increased resistance of the erythrocytes, and a lessened tendency to jaundice when hemolytic agents are given, it is apparent that the spleen must play a more important metabolic function than is usually thought. This paper presents a review of the literature as regards the influence of the spleen on metabolism.

METABOLISM STUDIES ON ANIMALS BEFORE AND AFTER SPLENECTOMY.

Eppinger (1) and King (2) have studied the fat content of the blood of normal and splenectomized animals and of persons suffering from diseases characterized by hemolysis. They found that the blood of dogs after splenectomy showed an increase of the total fats and of cholesterol, with a lowering of the iodine number, representing the unsaturated fatty acids. The cholesterol esters were variable. They assert that these results show the possible influence of cholesterol and of the unsaturated fatty acids in changing the conditions of hemolysis after splenectomy. Dubin and Pearce (3) in contradiction to the above have shown that splenectomy has no influence on the blood fat.

Richet (4) has shown that in order to maintain the weight of a splenectomized dog a much larger amount of food is required than is the case with the normal dog. Paton (5) found that splenectomy in dogs caused no essential difference in the nitrogen and salt metabolism.

Mendel and Jackson (6) detected no change in the purin metabolism following splenectomy in dogs and cats. Verzar (7) found no change in the respiratory gas exchange following splenectomy in dogs, and Karenchevski (8) found that splenectomy in dogs had no effect on the gaseous and nitrogen metabolism. Austin and Ringer (9) found that in dogs splenectomy did not in any way modify the course of the glycosuria caused by phlorhizin.

Pearce (10) and his coworkers state that the spleen exerts no constant and important influence on metabolism and that the removal of the spleen in dogs is not followed by any disturbance of the nitrogen metabolism, fat utilization or iron elimination. They also found that splenectomy had no effect on the blood lipins.

Soper (11) found that the removal of the spleen in rabbits caused a gradual and a marked increase in the cholesterol of the blood. Samuley (12) in dogs rendered anemic by pyrodin found no essential changes in the protein metabolism.

Asher and Vogel (13) thought that splenectomy influenced the iron metabolism. In relation to the iron metabolism, Schmidt (14) taught that the liver is the depot for the iron from the food and that the spleen is the depot for the iron tissues and erythrocyte catabolism. The absence of the spleen therefore interfered with the utilization of the iron by the organism and led to an increased excretion.

King (14b) found that removal of the spleen in dogs was followed by little change in the metabolic processes. He found an increase in the fats and cholesterol of the blood, with an increased absorption of fats and an increased elimination of fatty acids. There was also an increased excretion of calcium and a slight increase in output of total nitrogen. The urea showed no constant change. The sugar of the blood was not changed nor was the assimilation limit for dextrose. The urinary chlorides were diminished. The endogenous uric acid was not changed.

METABOLISM STUDIES IN MAN BEFORE AND AFTER SPLENECTOMY.

Bayer (15) studied the iron elimination after splenectomy in a case of rupture of the spleen and in a case of Banti's disease. He found an increased output of iron after splenectomy in a case of the ruptured spleen which later returned to normal. In the case of Banti's disease no change in the iron elimination was found after splenectomy.

Roth (16) studied the iron elimination in a case where the spleen was removed three years before on account of hemolytic jaundice and splenomegaly, and in a case where the spleen was removed one month before on account of rupture. He found that on both high and low iron diets the amount of iron absorbed by each of these was the same, but that the output in the second case was twice that of the first. He concluded that splenectomy in hemolytic anemias is followed by a reduction in the elimination of uric acid, iron, and of urobilin, showing that there exists a decreased destruction of tissue and blood elements.

Pepper and Austin (17) report their findings in a study of the metabolism before and after splenectomy in pernicious anemia. They found that a positive nitrogen balance before splenectomy was followed by a positive retention, fourteen days after operation, and a return to the preoperative balance after one month. The uric acid output never above normal showed a decrease of twenty-two per cent. postoperative. The output of iron in the feces never above normal decreased forty per cent. postoperative. The excretion of urobilin and urobilinogen in feces before splenectomy was three times the normal. Two months after the operation the output was one half of that before the splenectomy.

Umber (18) studied the metabolism in two individuals splenectomized for Banti's disease and found no marked variations in disturbance of the urinary constituents that could be attributed to the absence of the spleen. He found that after removal of the spleen it was easier to obtain nitrogen equilibrium which he attributed to a preoperative pathological destruction of protein due to a toxic cause. His figures show a greater output of purins before splenectomy than after.

Grosser and Schaub (19) have failed to find an increased destruction of protein in Banti's disease. Luce (20), Müller (21), and Lommel (22) have also failed to find an increased destruction of protein in Banti's disease.

Goldschmidt, Pepper and Pears (22) studied the metabolism before and after splenectomy in congenital hemolytic jaundice. They found that a slight positive nitrogen balance before splenectomy was followed by a positive retention eight days after the operation. The uric acid was decreased forty-seven per cent. after operation. Directly after operation a change in partition of creatinin and creatin occurred, but the total creatinin was unchanged. In the other urinary nitrogen constituents no change was found. No changes in hydrogen ions concentration occurred. The utilization of nitrogen at all times and the fat metabolism were normal. They found a large loss of iron through feces before splenectomy was followed by a forty per cent. decrease after the operation. The urobilin and urobilinogen in feces, after operation, was only one ninth as much as before the operation.

Tileston and Griffin (24) studied the total nitrogen, urea nitrogen, ammonia nitrogen, creatin, and creatinin in a case of chronic family hemolytic jaundice for a period of three days. On a creatin and purin free diet they found that the creatinin and urea values were normal, those for ammonia somewhat high. They found 0.06 gm. of creatin in the urine a day and found the endogenous uric acid increased. They found that tests for ailmentary glycosuria and levulosuria were negative or inconclusive. Minkowski (25) mentions that in a case of family hemolytic jaundice, Haal found an increased excretion of uric acid and a decided increase in the urinary iron.

Umber (26) found a toxigenic decomposition of protein in a case of Banti's disease. He did not think it was due to the anemia present, but since the protein destruction disappeared after removal of the spleen, he thought it was due to a toxic agent produced in the spleen. He concluded that this toxic substance not only produced anemia, but also affected the general metabolism of the organism. In another case with similar clinical symptoms, Umber found a retention of nitrogen and periodic variations in the excretion of the urinary purin nitrogen. Halpern (27), in a case of splenic anemia, found that the average purin nitrogen excretion, on a purin free diet, for a period of three days was 0.253 gm.

McPhedran and Orr (28), in a case of congenital hemolytic jaundice with splenomegaly, found six times as much urobilin in the feces as in the stool of a normal control. Möller (29) found also that the total urobilin excretion in the urine and feces is greatly increased in hemolytic jaundice. The decreased urobilin excretion after splenectomy is considered as indicative of the checking of the hemolysis and as justifying a favorable prognosis. This is particularly true of congenital hemolytic jaundice. In regard to its value in cases of splenectomy for pernicious anemia, the observations are contradictory.

Minot (30) reported studies on the nitrogen metabolism before and after splenectomy in a case of pernicious anemia. He determined the nitrogen of the urine and the feces and the urea and ammonia in the urine. He found a change from a slight negative to a slight positive nitrogen balance and an increase in percentage of urea after the splenectomy.

Lo Monaco (31) found no change in the uric acid elimination after splenectomy. Mendel and Gibson (32) studied the nitrogen, uric acid, urea, ammonia, and mineral metabolism after splenectomy in a man suffering with splenomegaly, secondary to malaria and secondary anemia. They found no striking variations. Moraczewski (33) studied the nitrogen and mineral metabolism after splenectomy for malaria splenomegaly and found no important changes. Rosenqvist (34) found in pernicious anemia and in bothriocephalus anemia variations in the nitrogen metabolism with periods of increased and decreased elimination. He thinks these conditions are accompanied by a toxigenic protein decomposition. Von Noorden (35) opposes this view and thinks the protein variations are due to the renal and alimentary changes that accompany the anemia.

Halpern (36), in a study of one case of pernicious anemia and one of splenic anemia, found normal values for the various urinary constituents. Rosenbloom and McKelvy (37) studied the metabolism in a case of congenital hemolytic jaundice with splenomegaly for a period of five days. They found a loss of 4.06 gm. nitrogen and a normal urinary nitrogen partition with the exception of the uric acid nitrogen which was increased. The nitrogen absorption was normal. They found a loss of 1.88 gm. of sulphur and a normal sulphur partition with occasional increased ethereal sulphates. They found a loss of 0.482 gm. of calcium oxide and 0.924 gm. of magnesium oxide. There was a retention of phosphates (0.07 gm.), while the amounts of earthy phosphates and total phosphates of the urine was normal. There was a loss of 0.1199 gm. of iron, with marked increased amounts of iron excreted in the urine and feces. The fat metabolism was normal, with an absorption of ninety-one per cent. of the ingested fat. The amounts of neutral fat, fatty acids and soaps in the stool were normal. Urobilin and urobilinogen were present in the urine and feces.

Denis (37b) found that splenectomy in anemia produced no change in the blood fat. Abelous and Soula (37c) think that the spleen is the place where the blood cholesterol is produced. Minot (37d) found after splenectomy in a case of pernicious anemia a disappearance of urobilinogen from the urine, a more favorable nitrogen balance and a rise in the per cent. of urea nitrogen of the urine.

Rosenbloom and McKelvy (38) studied the cholesterol metabolism in a case of congenital hemolytic jaundice and found a large loss of cholesterol from the body and they believe that this may be the cause of the lessened resistance of the red blood cells present in this disease. Medak (39) reports the following results obtained in a study of the cholesterol and cholesterol esters of the blood in certain diseases of interest in relation to diseases of the spleen:

Disease	*Free cholesterol in 1000 c.c. of blood gm.*	*Combined cholesterol in 1000 c.c. of blood gm.*	*Total cholesterol in 1000 c.c. of blood gm.*
Banti's disease before splenectomy	0.9736	0.3480	1.3216
Banti's disease after splenectomy	1.3980	0.7356	2.1336
Banti's disease before splenectomy	0.9510	0.5470	1.4980
Banti's disease after splenectomy	1.0720	0.7140	1.7860
Hemolytic jaundice before splenectomy	0.4910	0.6330	1.1240
Hemolytic jaundice after splenectomy	0.9560	0.3400	1.3020

His results show an increase in the free cholesterol of the blood after splenectomy. King (40) has also found that after splenectomy there occurs an increase in the total fats and cholesterol in the blood. Roth (41) found no increase in the iron elimination in a case of congenital hemolytic jaundice, studied three and one half years after the removal of the spleen.

Eppinger and his coworkers (42) found in hemolytic jaundice that the maximum amount of urobilinogen in the feces was 4.0 gram, the minimum was 0.012 grams found in a case of carcinomatosis and the normal average was 0.13 gram. The large increase in hemolytic jaundice is striking.

Robertson (43) and other workers have shown that a decreased excretion of urobilin takes place after splenectomy in various diseases of the blood.

Pearce and his coworkers (44), studying the relation of the spleen to blood destruction and regeneration and to hemolytic jaundice, have shown that during the first month after splenectomy, hemoglobinuria due to hemolytic serum was not followed by jaundice, and that the red cells had an increased resistance to hemolysis, while three and one half months after and even later jaundice occasionally occurred spontaneously. They have also demonstrated that the absence of the spleen has no important influence on the elimination of hemoglobin by the kidneys or its transformation into bile pigments, or the removal of such pigments. Also that the difficulty of producing hemoglobinemia and jaundice in animals splenectomized one month or more, is due to an increase in the resistance of the red cells and this increase depends upon the corpuscles rather than the serum, and they think it is associated with anemia, caused by hemolytic serum and that it is a concomitant of the regeneration of the blood, which follows the anemia caused by the removal of the spleen.

They conclude that splenectomy in the hemolytic anemias is, as a rule, followed by a reduction in the elimination of uric acid, iron, and urobilin, changes indicative of decreased destruction of tissue and blood elements.

Eppinger (45) studied the nitrogen metabolism in two cases of hemolytic jaundice, before and after splenectomy, one case of the acquired and one case of the congenital type, and concluded as follows: *"Wir kommen somit zu der überzeugung, dass mauche Fälle von hämolytischen Ikterus einen gesteigerten Stoffwechsel beigen doch von einer typischen Erscheinung lasst sich hier nicht sprechen."*

In the following tables are his data:

CASE I.

	Before splenectomy —weight 52 Kg.			*14 Weeks after splenectomy —weight 52½ Kg.*		
	N. intake	*N. output*		*N. intake*	*N. output*	
Day	*gm.*	*Urine gm.*	*Feces gm.*	*gm.*	*Urine gm.*	*Feces gm.*
1.	15.7	14.23		15.6	13.67	
2.	15.2	13.97		15.19	12.78	
3.	15.6	14.07		15.9	12.67	
4.	15.3	13.67	15.3	15.3	12.67	
5.	15.3	13.98		15.96	12.08	17.02
6.	15.6	13.78		15.13	13.99	
7.	15.7	14.30		15.3	13.78	
8.	15.8	14.70		15.76	13.10	
Total	125.2	112.7	15.3	123.85	104.76	17.02
Balance	17.5 gm. protein loss			12.94 protein gain		

CASE II.

	Before splenectomy			*10 Weeks after splenectomy*		
	N. intake	*N. output*		*N. intake*	*N. output*	
Day	*gm.*	*Urine gm.*	*Feces gm.*	*gm.*	*Urine gm.*	*Feces gm.*
1.	12.5	11.13		12.7	10.34	
2.	11.5	10.67		11.9	10.18	
3.	11.9	10.35		12.5	10.32	
4.	12.3	10.63		12.2	11.52	
5.	12.2	11.34		12.6	10.63	
6.	12.5	11.76	12.63	12.0	9.60	12.01
7.	12.3	10.38		11.8	10.79	
8.	11.5	11.61		12.7	9.80	
Total	96.7	87.87	12.63	98.4	83.18	12.01
Balance	23.75 gm. protein loss			20.06 gm. protein gain		

In a case of congenital hemolytic jaundice (46), studied before and after splenectomy, in relation to the iron and uric acid he found the following:

	Iron in stool *Mg.*	*Uric acid in urine* *Gm. (averages)*
Before splenectomy	0.177	0.834
One month after splenectomy	0.240	0.263
Three months after splenectomy	0.210	0.364

In a case of acquired hemolytic jaundice (47) he found that the iron excretion was as follows:

	Milligrams iron in stool
Before splenectomy	0.191
One month after splenectomy	0.230
Three months after splenectomy	0.220

In two cases of acquired hemolytic jaundice (48) he reports the following study of the uric acid excretion before and after splenectomy:

Case. No. I.	*Date*	*Uric acid*	*Case. No. II.*	*Date*	*Uric acid*
	3/18	1.45		3/26	1.606
	3/19	1.70		3/27	1.701
	3/20	1.23		3/28	1.679
	3/21	1.46			
Splenectomy			Splenectomy		
	5/15	0.07			
	5/16	0.045		2/17	0.245
	5/17	0.042		4/18	0.240
	5/18	0.026		4/19	0.255

He (49) found the following values for the uric acid excretion before and after splenectomy tabulated as in this table:

Case No.	*Disease*	*Date*	*Uric acid*	*Remarks*
1.	Pernicious anemia	1/3	0.976	
	" "	1/4	0.786	
	" "	1/5	0.778	
	" "	1/6	0.802	Splenectomy 1/9
	" "	4/15	0.802	
	" "	4/16	0.057	
	" "	4/17	0.097	
	" "	4/18	0.067	
2.	" "	3/6	1.532	
	" "	3/7	1.04	
	" "	3/8	1.13	
	" "	3/9	0.97	Splenectomy
	" "	8/1	0.092	
	" "	8/2	0.120	
	" "	8/3	0.170	
	" "	8/14	0.087	
1.	Hypertrophic cirrhosis	3/26	1.606	
	" "	3/27	1.710	
	" "	3/28	1.679	
	" "	3/29	1.597	Splenectomy
	" "	4/17	0.245	
	" "	4/18	0.240	
	" "	4/19	0.253	
	" "	4/20	0.300	
2.	Hypertrophic cirrhosis	3/4	1.186	
	" "	3/5	1.107	
	" "	3/6	1.182	
	" "	3/7	1.170	
	" "	6/8	0.374	After splenectomy
	" "	6/9	0.297	
	" "	6/10	0.302	
	" "	6/11	0.291	

In a case of splenomegalic cirrhosis with jaundice (50) he found in an eight day period before splenectomy that the protein balance was positive 0.437 grams, while in an eight day period, seven weeks after splenectomy, the protein balance was 1.5 grams. In the same case he reports the following in a study of the iron and uric acid metabolism:

Before splenectomy	*Uric acid*	*Iron in urine*	*Total iron*	
	0.876	0.147	0.201	8 day period.
	1.380			
	0.937			
	0.876			
Six weeks after splenectomy	0.276	0.410	0.476	11 weeks after splenectomy.
	0.290			
	0.310			
	0.220			

In a case of hypertrophic cirrhosis of the liver (51) Eppinger found in an eight day period before splenectomy that the patient had a positive protein balance of 0.625 grams. In an eight day period two months after the splenectomy, the protein balance was positive 1.125 grams.

In the same case the following were the results obtained in a study of the iron and uric acid metabolism:

	Uric acid	*Iron in urine*	*Total iron excreted*	*Period*
Before splenectomy	0.98			
	1.376			
	0.876	0.117	0.179	7 days
	1.008			
Eleven weeks after splenectomy	0.301	0.321	0.391	6 days
	0.263			
	0.318			
	0.229			

In a case of hemolytic pernicious anemia, he obtained the following values for the iron excretion before and after splenectomy:

	Mg. Fe in stool	*Mg. total Fe.*	*Period*
Before splenectomy	0.172	0.188	6 days
Four weeks after splenectomy	0.331	0.358	7 days
Three months after splenectomy	0.276	0.301	6 days
Six months after splenectomy	0.210	0.227	6 days
Eighteen months after splenectomy	0.437	0.447	6 days

In this case he also studied the nitrogen balance before and three months after splenectomy. In eight days before splenectomy the patient lost 2.5 grams of protein and in an eight day period after splenectomy the patient had a positive protein balance of 37.625 grams.

It seems from Eppinger's studies that the removal of the spleen affects the iron and uric acid metabolism, and cases with a protein loss before splenectomy showed a protein gain after splenectomy.

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The Enlarged Thymus Gland from the Viewpoint of the Laryngologist*

By L. HUBERT, M.D.,
New York.
Assistant Surgeon, Manhattan Eye, Ear and Throat Hospital; Attending Otolaryngologist, Lenox Hill Dispensary.

Enlargement of the thymus gland is of considerable interest to laryngologists on account of its assumed relation to sudden death which might occur during or after an operation on the nose and throat. Usually our attention is not directed toward such cases until after such an accident occurs. It is obvious that we should endeavor to recognize these cases before an operation is undertaken, exercising great care when there is a history of dyspnea, attacks of suffocation, and choking, or when the appearance of the patient suggests a possible status lymphaticus.

In recent years our opinion in regard to the persistence of the thymus gland has been changed. It was believed formerly that this gland increased in size up to the second year after birth, and that then it gradually diminished and disappeared more or less entirely soon after adolescence.

During the world war an opportunity presented itself to examine large numbers of healthy men who had been killed suddenly. In a considerable number of cases the thymus gland was persistent and lymphoid hyperplasia was found (1). It was therefore concluded that this gland did not disappear so rapidly as had been generally thought and that the lymphoid tissue of youth persisted well into adult life.

Today it is generally accepted that the thymus gland is an organ belonging to the period of growth and development. It reaches its greatest size at the time of puberty, then undergoes a process of involution, but does not disappear entirely during life (2). It is nevertheless true that in certain cases an abnormally large thymus gland and an unusual amount of lymphoid tissue are present, which justify us to speak of a status thymicolymphaticus.

In the last three years I had an opportunity to study six cases belonging to the status thymicolymphaticus group, which had been referred to the hospital for operation on tonsils and adenoids. In three of these cases x ray examination showed an enlargement of the thymus gland. The other three patients were suspected on account of their general appearance. They showed certain signs which have been associated with a status lymphaticus.

REPORT OF CASES.

Case I.—J. T., male, six years old, was referred to the throat clinic of Lenox Hill Hospital in May, 1921, for removal of adenoids. The chief complaint was that he could not breathe well, especially at night. He had been examined in various clinics and by private physicians, all believing that the trouble was due to adenoids. The child had had practically all the diseases of childhood—measles, German measles, whooping cough, chickenpox, pneumonia, and was subject to colds and grippe. He also had had rickets and was bowlegged, so that he had to wear a brace for nine months. He had often had attacks of fainting, when he would stop breathing and appear to be dead. When he was four years old his tonsils and adenoids were removed in one of the Board of Health stations (August 14, 1919). Following the operation he was very ill, vomited for four days, and had fever, which on one occasion, was 104° F. Three weeks after the operation he was taken to Mount Sinai Hospital, where he stayed six weeks and was treated for acute nephritis.

The difficulty in breathing persisted practically since birth. There was no improvement following the operation. On questioning the mother of the child closely I found that the trouble was not an obstruction to nasal breathing, but was a dyspnea, inspiratory in type, coming on at night or after exertion, and accompanied at times by attacks of suffocation.

Examination showed that the tonsils had been thoroughly removed, and that there was practically no adenoid tissue. The nasal septum was thickened and deviated. There was marked dullness on percussion over the manubrium sterni. Physical examination in general showed certain signs of maldevelopment, which have been associated with status lymphaticus. The upper extremities were too long, compared with the thorax. There was a marked hyperextension of the phalanges, and a falling of the plantar arches (flat feet). Teeth showed small lateral incisors as compared with the central incisors. The canine teeth were flat, instead of fanged. Examination of the urine showed it to be normal.

The diagnosis of enlarged thymus was made on the history of dyspnea and attacks of suffocation and the dullness on percussion over the thymic area. It was confirmed by the x rays. An x ray examination of the chest on May 23, 1921, at the Lenox Hill Hospital, revealed a quadrilateral shadow occupying the upper and midpart of the chest. This shadow could be separated distinctly from the heart shadow and was believed to be a thymus gland. The treatment consisted of deep x ray exposures. After a few treatments the attacks of dyspnea and suffocation were gone. At the present time there is some difficulty in nasal breathing, due to a sinusitis. There is no question that the x ray therapy was of great value. He was given about twelve such treatments.

This case shows the importance of taking a careful history and of ascertaining the exact nature of respiratory difficulty. Dyspnea and attacks of suffocation cannot be due to tonsils or adenoids. The case also shows that a patient with an enlarged thymus can be operated upon without necessarily a fatal result.

Case II.—A. K., five months old, male, was brought to the Manhattan Eye, Ear and Throat Hospital on January 4, 1923. The chief complaint was difficulty in breathing. His mother was seventeen years old, his father thirty years old, both in good health. The patient was their first child.

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*Read, in part, and cases I, II, and III, presented before the Section of Rhinology and Laryngology, New York Academy of Medicine, January 24, 1923.

The child was delivered by Cæsarean section in the Manhattan Maternity Hospital. The present trouble started three weeks after discharge from the maternity. It was noticed that the child had difficulty in breathing, especially at night. He became blue in the face and had attacks of suffocation. These attacks occurred whenever the child cried. He had been examined a number of times in a pediatric clinic and by private physicians. A Wassermann test was taken both of the child and its parent with negative results. The underlying condition was not discovered.

When the patient was brought to the Manhattan Eye, Ear and Throat Hospital, the history the mother gave made us suspect a possible enlargement of the thymus gland. There was some dullness and a sense of resistance over the manubrium sterni. Examination of the nose and throat was practically negative. The child also showed a congenital angioma on the scalp. An x ray examination showed just above the heart shadow an area of density extending on both sides of the vertebral column, which suggested an enlarged thymus. A history of difficult breathing, associated with congenital malformations, as in this case, and a congenital angioma indicates possibly an enlarged thymus.

Case III.—H. E., eighteen months old, male, was brought to the Manhattan Eye, Ear and Throat Hospital on December 23, 1922. The chief complaint was difficulty in breathing. The mother had had six children. Four were alive and well; one died suddenly when one day old, and another was born dead on account of difficult labor after which version was performed. The child was born in Harlem Hospital. It was a very quick breech delivery, lasting only ten minutes. For several days it was difficult to get the child to breathe and it could not take the breast for two weeks. It had to be kept in an incubator, although the pregnancy lasted fully nine months. The child began to sit up when ten months old, but did not walk at eighteen months. The present complaint started when the child was born. Three or four times during the night the child awoke and had attacks of dyspnea. At a children's clinic the mother was advised to have the child's tonsils and adenoids removed. Examination revealed hypertrophied tonsils and adenoids, but their size was not sufficient to explain the dyspnea. The child also showed a hyperextension of the phalanges and a very marked hyperextension of the knee joints. The latter condition might explain why the child did not walk. X ray examination showed above the heart shadow an area of density extending on both sides of the vertebral column, suggesting the presence of a thymus gland.

These three patients represent one group of cases in which the most obvious symptom is dyspnea. It is characterized by the fact that it is paroxysmal and exaggerated by hyperextension of the head and dorsal decubitus. For this reason it is worse at night. Between the attacks the respiration may be perfectly normal. The thymus gland is enlarged in every case.

STATUS LYMPHATICUS OR STATUS HYPOPLASTICUS.

There is a second group of cases in which the most characteristic symptom, so far as we are concerned, is nasal obstruction. The patients are referred to us for operation on tonsils and adenoids. Their appearance arouses a suspicion that they might belong to what has been termed the status lymphaticus or the status hypoplasticus group. In these cases there may be very little or no enlargement of the thymus gland.

Status lymphaticus or status hypoplasticus is characterized by a hyperplasia of the lymphoid tissue and a hypoplasia of the most important organs of the body, like the heart, the aorta, and some of the glands of internal secretions, especially the adrenals, the pituitary, the genitals and the thyroid. Well marked cases of status lymphaticus are easily recognized, and readers are referred to Timme's excellent publication on this subject (3). The lesser grades of status lymphaticus, however, are easily overlooked, although if certain more or less definite signs are recognized, a diagnosis may often be established with reasonable certainty. The detection of these cases would be greatly facilitated if it were possible to demonstrate by the x rays the hypoplasia of the heart and the aorta. Ewing (4) says: "I know of no observations by the röntgen ray on the appearance of the hypoplastic heart and aorta."

In a recent lecture before the German Medical Society of the City of New York, Dr. Franz Kroedel, of Bad Nauheim, called attention to the fact that the hypoplastic heart could be demonstrated by the orthodiagraphic method. This is done by determining accurately the ratio between the heart and the lung shadows, the normal ratio being one to two. The hypoplastic aorta, however, cannot be shown by the x rays.

REPORT OF A CASE OF STATUS LYMPHATICUS.

Case IV.—I. S., male, five years old, came to the Manhattan Eye, Ear and Throat Hospital on March 19, 1921, for the removal of tonsils and adenoids. The chief complaint was nasal obstruction which had been present practically since birth. The child also complained of getting tired easily and of general weakness. Examination revealed a healthy looking boy with a large amount of adipose tissue. The skin was smooth, delicate, and a pronounced blush was present on the cheeks. The tonsils and adenoids were hypertrophied and there were enlarged lymph follicles on the base of the tongue. The glands of the neck were also somewhat enlarged. The breasts were well developed and the pelvis was of the female type. The penis and the testicles were quite small, but otherwise normal. X ray examination on March 22, 1921, showed the sella turcica to be clear, and there was a faint suspicion of the thymus gland on both sides. I advised against operation. Recently the social service department of the hospital investigated the condition of the patient, and I was informed that he was being treated from the endocrinological aspect in one of the clinics of this city and that he felt fairly well.

This case was believed to belong to the status lymphaticus group on account of the general appearance of the boy, who presented a picture of health, yet was not strong.

STATUS LYMPHATICUS IN ADULTS.

In the adult the detection of status lymphaticus is not so simple. It is due to the fact that compensation of the various endocrine glands occurs, whose secretions are supposed to be antagonistic to the thymus gland. Therefore, we must add to the clinical picture the characteristics of secondary involvement of the thyroid, pituitary and adrenal glands (5).

DIAGNOSIS OF STATUS THYMICOLYMPHATICUS.

The diagnosis of status thymicolymphaticus is made on the history, general appearance and examination of the patient, and confirmed by x rays. It is not practical to take x ray photographs of the thymus gland in all cases that need operative intervention, nor would this procedure exclude those cases of status lymphaticus in which the thymus is not enlarged. The demonstration of a hypoplastic heart by the orthodiagraphic method, if practical, in all suspicious cases, would be of great value in the diagnosis.

SUMMARY.

Two groups of cases belonging to the status thymicolymphaticus type are described. First, those in which the enlarged thymus is the most prominent feature, and in which dyspnea, especially at night, is the most outstanding symptom. Second, cases which present certain signs that have been associated with status lymphaticus, with little or no enlargement of the thymus gland, and in which nasal obstruction and general weakness are the most prominent symptoms. Attention is called to the importance of ascertaining the exact nature of the respiratory difficulty and of considering a possible status lymphaticus in all suspicious cases. If this is done, we may be spared the tragic experience of an unexpected loss of a patient on the operating table. A fatal outcome does not necessarily ensue, but all patients of this type have a low resistance and complications frequently are likely to follow.

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161 East Seventy-ninth Street.

Recent Developments in Parathyroid Therapy

By H. W. C. VINES, M.D.,
Cambridge, England,
Beit Memorial Research Fellow, Fellow of Christ's College, Cambridge, England.

Owing to the confusion which may arise in studying the literature of the parathyroid glands, it is necessary to insist at the outset on the complete differentiation between the thyroid and parathyroid organs. Morphologically, structurally and functionally there is complete separation between the two types of glands; there is no conclusive evidence that the one can ever take on the function or histological appearance of the other; their removal produces a totally different symptomatic syndrome in each case, and their chemical properties are quite unlike. On the other hand, there is quite a considerable amount of evidence to show that the biological activities of the two glands are more probably antagonistic than synergic.

With the identity of the parathyroid glands established, the determination of their function naturally follows. The accepted view at the present time is that these glands serve a dual purpose; first they have the power of removing certain toxic substances from the blood stream, and second they are the essential regulators of calcium metabolism. This dual function has been epitomized from observations on clinical and experimental tetany, a field of research which overshadows all else in the literature. The toxic substances in question have been shown to be guanidine derivatives (1, 2), either guanidine itself or the methyl compound. These substances are irritative to nerve cells, and the calcium deficiency which accompanies parathyroid tetany serves to increase the nervous irritability, since the action of calcium on nerve cells is depressant or inhibitory. Following the investigation of tetany, the application of parathyroid therapy to disease has been naturally to conditions of convulsive type. We therefore find it advocated in paralysis agitans (3), in epilepsy (4), in chorea, uremia, eclampsia and so forth, since in all these conditions convulsive symptoms are present. Uremia and eclampsia are due frankly to toxemias, while a toxic basis has been suggested in epilepsy by several authors. In the following paragraphs the relation of the parathyroid glands to toxic conditions will be considered, more especially to those states in which convulsive phenomena are absent.

The withdrawal of calcium from the circulation by increased elimination is said to lead to increased irritability of the nerve cells, but yet this is not always manifested by convulsive signs, for in diabetes calcium loss may be considerable but convulsive signs are not common. In tetany, moreover, convulsions do not occur until thirty per cent. of the normal calcium content of the serum has been lost (5). What then is the effect of lowering the calcium content of the serum to a figure between the normal and the convulsive threshold? Decrease may be of two types; it may be absolute, when the total amount of calcium in the serum is lessened, or it may be relative when the total is unchanged but when some of the calcium is bound, possibly by combining with some substance so that the complex formed is not assimilable by the tissues. In either case the effect on the somatic cells is the same; they suffer from a deficiency of calcium which they can utilize.

In two series of cases investigated by me the latter form of calcium deficiency was present. The first series was limited to cases of varicose ulcer (6), which responded readily to parathyroid therapy, but less readily to calcium injections. In the second series (7), the cases by nomenclature were varied; they comprised chronic external or internal ulcerations, chronic infections of the nose and ears, chronic rheumatism, prostatic hypertrophy, certain chronic skin affections and so forth, and in addition to the cases actually investigated I have had successful results reported in chronic colitis. In all these conditions there is one common factor, the element of chronic sepsis and chronic toxic absorption from the septic focus. By intramuscular injections of calcium chloride it was found that an improvement in the condition was obtained, running concurrently with an increase in the precipitable calcium of the serum. These results have been recently paralleled by Graves (8), who used injections of colloidal calcium, in combination with lecithin, in mental states associated with chronic sepsis. But if the calcium metabolism is at fault, it is presumably the symptom of a more fundamental condition and it is natural to turn to the parathyroid glands. Parathyroid therapy was therefore used in the cases mentioned and the effect was identical with that produced by the calcium injections, except that it was more rapid and more complete. The calcium deficiency was reduced and the local lesion healed rapidly when it could be directly observed or its symptoms abated when internally situated.

In the course of using parathyroid therapy certain suggestive phenomena occurred. Where a purulent discharge was present it tended to increase about the second week of treatment, but if free drainage was naturally obtained it then decreased and finally stopped. In one case natural drainage was absent; the case was one of chronic appendicitis which became acute about the twelfth day of parathyroid treatment and required surgical interference. In certain cases no obvious septic focus was present, but parathyroid therapy was followed by a purulent discharge, often from the nose. In several cases leucocyte counts have been carried out, and that there is an actual leucocyte increase affecting chiefly the polymorphonuclear cells, is shown in the following table.

Case I.—H. G., male, aged thirty. Had had a gunshot wound of spine five years ago resulting in a complete paralysis below the umbilicus. Two bedsores were present; general debility.

Date	*Total Leucocytes*	*Polymorphs*	*Lymphocytes*
July 6	9,000	5,130	3,150
July 11	10,000	6,720	3,090
July 13[1]	17,000	13,310	3,828
July 15	16,400	12,336	3,772
July 17	15,400	10,786	3,696
July 20	18,000	13,860	3,600
July 25	18,200	14,352	3,312
July 29[2]	16,400	12,300	3,444

[1] Parathyroid therapy begun.
[2] Bed sores practically healed.

It is probable that this factor, the increase in somatic resistance, is one of the most important indirect effects of the action of parathyroid therapy in chronic infections. Calcium injections will apparently produce the same reaction, so that it would seem that the state of chronicity in infective conditions is due to an inhibition of effective cellular response, brought about by the relative calcium lack. It is possible that the calcium is bound by the toxic products of the infecting agent, and further that the parathyroid glands are damaged by the same means so that they are unable to rectify the disturbed calcium balance; ultimately therefore the onus of faulty resistance comes to rest on the parathyroid glands. If we refer to the literature of experimental tetany many instances are given and attention is often drawn to the marked decrease in resistance to infection of the parathyroidectomized animals (9). Apart from leucocytic activity there is some evidence of a decrease in antibody formation after parathyroidectomy. Ecker and Goldblatt (10) found that in rabbits thyroidectomy had no effect on the formation of hemolysins, but after the parathyroids were removed the titre of the serum was only one fifth that of the controls.

It may appear from what has been said, that a claim is made for parathyroid substance as a panacea. This is not the case except in so far as chronic infections form the bulk of common conditions with which the doctor has to deal. Further, it is not the parathyroid substance nor the calcium which is the curative agent; it is the phagocytic leucocyte, which is stimulated to increased activity indirectly by the action of the parathyroid hormone on the calcium metabolism. It is not possible to say whether the parathyroids are actively concerned in the removal of bacterial toxins from the blood or not, but it is very probable that in conjunction with other glandular organs they are liable to damage from such substances.

Much attention has been paid in recent years to toxic absorption especially from the teeth, with the result that patients suffering from chronic conditions such as rheumatoid arthritis have had all their teeth extracted on the grounds of pyorrhea. Yet in many cases no improvement has subsequently occurred, and it seems possible that the chronic toxemia has in course of time become complicated by chronic endocrine dysfunction. Hence though the toxic absorption may be remedied by the removal of septic foci, the endocrine insufficiency is more permanent and is not affected. Since it is the aim of medicine to accelerate the curative process when once disease is established, if in any case parathyroid therapy is decided upon, the first step must be the elimination of all septic foci so far as they are accessible. The best results are obtained by using the rational methods for promoting healthy tissue metabolism, and it must be realized that parathyroid substance is in no sense a "cure," but an indirect physiological stimulant of tissue resistance, which by its influence on calcium metabolism allows the defensive mechanisms of the tissues to have free play.

In the cases treated by Dr. Grove and myself, the dose of parathyroid substance used was one tenth grain of the desiccated gland given daily by the mouth. This amount was given usually for a fortnight and then continued or decreased according to progress; in some cases it was given for six weeks and in one case daily for six months, but signs of overdose were never observed. Judging by the content of precipitable calcium in the serum, the maximum effect is obtained after about eight days' treatment, but rise in the leucocyte count may commence earlier, and as has been already stated the patient must be watched after the first week for signs of pus accumulated without drainage. The preparation used throughout the clinical experiments was that made by a reputable drug house, and it must be pointed out that there may be considerable variation in the activity of the preparations on the market. The writer has been able to standardize these commercial preparations to some degree, and the following table will indicate the variations found:

Prepared by	ACTIVITY *Desiccated Powders*	 *Finished Tabloids*
A.	100, 93 100	60, 82, 68, 84, 64, 76, 69, 78, 66
B.	66	
C.	86	
D.	66	
E.	38	
F.	56	
G.		67
H.		31
I.		60

For therapeutic purposes desiccated powders under 60 are probably of little value or finished tabloids under 50. If results with one preparation are unsatisfactory it is advisable to try two or three different preparations before discarding the treatment entirely.

In the light of what has been already said, there are certain other conditions which require mention. So much has been written about tetany that it is needless to discuss it fully here, and the reader may be referred to the detailed account and bibliography given in Barker's *Endocrinology and Metabolism,* but in regard to the more acute convulsive conditions some further remarks may be made. Uremia has been treated with parathyroid substance by Remond and Menvielle (11) and successful results have been claimed. It is interesting to note that the authors found an increase in the blood urea after thyroid therapy but a decrease after parathyroid, suggesting an antagonistic action of the two substances. This may be parallelled by Hertz's (12) case of parathyroid insufficiency in which thyroid therapy aggravated the symptoms; Berkeley (3) advocates parathyroid therapy in paralysis agitans, but considers that the thyroid does serious harm, since simple thyroid massage is sufficient to cause the patient discomfort.

In the treatment of eclampsia, Massaglia (13) and Vassale (14) have claimed good results with parathyroid therapy. Turning again to the literature, we find that tetany frequently develops in pregnant animals in whom the parathyroids have been interfered with previously to the pregnancy. Borchers (15) records an illuminating case of this type in a woman who was treated for postoperative tetany by a parathyroid graft. She became pregnant, however, and in the fourth week complained of pains in the arms and legs; in the fifth month tetany became so acute that it was necessary to terminate the pregnancy, and after that she recovered completely. The graft was obviously unable to stand the extra strain, though it was sufficiently active to keep her in good health under normal conditions. From such observations the use of parathyroid therapy in the early stages of pregnancy might be worth consideration, at least on an experimental basis.

In addition to the toxic conditions in which the calcium available for the tissues is affected, there are other states in which gross errors of calcium metabolism occur, and it is possible that the parathyroid glands are involved in these also. Broderick (16) has put forward suggestions that dental caries may have an endocrine basis, and Erdheim (17) showed that defective calcification of the enamel occurred in parathyroidectomized animals. Broderick lays stress upon the likelihood of dental caries to occur in acute infectious fevers and in pregnancy, conditions in which the writer considers that parathyroid damage may occur. Delayed union of fractures is another condition in which the calcium metabolism is involved. In man this is commonly associated with some chronic septic condition; Morel (18) notes delayed union in parathyroidectomized animals and the writer can record a case improved by parathyroid therapy and removal of septic teeth.

In considering bony changes due to errors of calcium metabolism, the controversial condition of rickets naturally occurs to me. The pathology of the condition implies defective calcification of bone, but its cause is not yet clearly defined. The prevalent theory is perhaps that it is a deficiency disease due to insufficient vitamine supply associated with unhygienic conditions of life. Apart from the calcium deficiency, there is some evidence which suggests a parathyroid involvement, possibly as a secondary condition, but one to which the calcium error is due. Rickets is one of the diseases with which tetany is associated, and Paton and Findlay (19) concluded that active rickets accelerated the effect of parathyroidectomy in animals, but that the presence of healed rachitic lesions had no such effect. Boez (20) working with young rabbits found that dried parathyroid gland given with calcium phosphate hastened the rate of calcification in the bones, an effect which was not obtained by the calcium salt alone. In human beings, Pappenheimer and Minor (21) found a very definite enlargement of the parathyroid glands, due to a multiplication of the gland cells and irrespective of the state of nutrition of the subject. Mellanby (22) has pointed out the increased susceptibility of rachitic dogs to infection, and also of the occurrence of ocular changes such as cataract; this has been frequently mentioned as occurring in parathyroidectomized animals, and in man Sainton and Paton (23) have recorded a case of parathyroid insufficiency where double cataract developed. McCarrison (24) observed intense congestion in three cases and hemorrhagic infiltration in one case in the parathyroids of monkeys fed on vitamine deficient diets, accompanied by gross lesions in the intestine. He suggests that the parathyroid changes were due to toxic absorption from the gut; the thyroid glands in these cases were not affected in a similar manner nor in similar degree, Dragstedt (25) considers that there is a relation between tetany and poisoning of intestinal origin. These facts all point to the possible involvement of the parathyroid glands in rickets, and since the error of calcium metabolism figures so largely in the condition, it is possible that parathyroid therapy might be of value.

There is thus no small amount of evidence to emphasize the fundamental importance of calcium in the economy of the living organism. Of almost equal importance will be the organs which regulate its qualitative and quantitative relationship to the tissues. The regulation of calcium metabolism is a function which has been assigned to almost all the endocrine glands in turn, but in the majority of cases the evidence is highly unsatisfactory, and while one is prepared to admit a certain indirect control through the medium of the parathyroid glands, there is no reason to suppose that any other organ has a degree of control at all comparable to that of the parathyroids. In hyperthyroidism, for instance, there is a marked calcium loss and in hypothyroid states a certain calcium retention (26). Following the suggestion that the thyroid and parathyroids are antagonistic and that the parathyroid tends to stabilize calcium metabolism, there is no need to assign a definite function of calcium control to the thyroid. In diabetes again calcium loss is considerable, and an influence on calcium metabolism by the pancreas has therefore been suggested. But parathyroidectomy tends to increase sugar elimination in diabetic dogs and thyroidectomy to decrease it; it seems therefore that the parathyroids have an inhibitory action on the excretion of sugar. Friedmann and Gottesmann (27) found that diabetic dogs were more susceptible to tetany after thyroidectomy and partial parathyroidectomy than were nondiabetic dogs; they found also that thyroidectomy checked the sugar elimination. These results seem to suggest that the remaining parathyroids in diabetic dogs were less efficient than those of nondiabetic dogs. Is it unreasonable to suppose that the parathyroids may be involved in the same toxic process as the pancreas, or at least damaged by the toxic products of imperfect sugar metabolism? There seems to be no necessity for the assumption of a calcium control by the pancreas. In connection with the relation of sugar excretion and the parathyroids, it is interesting to note that Fletcher (28) found a lowered sugar tolerance in the majority of his cases of chronic arthritis. Finally in regard to those glands associated with the processes of growth, the pituitary, the gonads and perhaps the suprarenal bodies, if the rate of growth of the somatic cells is accelerated, the demand for calcium will be increased and the parathyroid glands will respond to such demand in a physiological manner. There seems to be no reason for assigning control of calcium metabolism directly to any other gland, and there is no evidence to show that any other gland can even partially restore the disordered calcium metabolism of clinical or experimental tetany.

The present position of the parathyroid glands in medicine may be briefly summarized. From the study of tetany the regulation of calcium metabolism and the removal of guanidine derivatives from the system have been established as normal functions of these glands. The importance of the latter function is at present limited to tetany, but the regulation of calcium metabolism links up the parathyroid glands with every cell in the body. Among the normal functions of the somatic cells are the mechanisms of resistance to toxic agents, produced either by faulty metabolism or by infective processes; suggestions have been put forward to indicate how the parathyroid glands may be of assistance, through their influence on calcium metabolism, in overcoming the harmful action of such substances.[1]

Christ's College.

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[1] The author's references will appear in his reprints.

Some Neurological and Therapeutic Aspects of Hypophyseal Tumors*

By IRVING H. PARDEE, M.D.,
New York,
Associate Physician to the Neurological Institute.

Since Cushing's monograph on pituitary disease in 1912, knowledge of this gland, clinical syndromes of its disturbances, and their therapy, have become enormously elaborated. The progress of the study of the endocrinous organs has been also greatly developed within this time, not only in practical clinical interpretation, but also in the experimental laboratory, notably by Cannon, Hoskins, and others. Although the study of the thyroid, because of its location and size, and its more easily studied functions has quite outstripped that of the pituitary, the latter is constantly reasserting its importance in the chain of glands.

The pituitary gland is best considered as a double organ with an intervening portion, the three portions having different functions, the anterior supposedly of importance in the sphere of metabolism, bone, tissue, and sexual growth; the posterior as a regulator of function, such as blood pressure, smooth muscle contraction, menstruation, and other functions.

Disturbances in function of this gland, therefore, can produce symptoms of any or all portions, thus introducing a variety of conditions, the most striking and easily recognized of which being those produced by tumors. The part which the pituitary plays in the psychoses, menstrual difficulties, epilepsy, feeblemindedness, headache, and in a host of other disorders, is still clouded by a mass of conflicting opinion, but the question of neoplasm has now passed into the realm of medical certainty, and in late years has been further clarified by the use of the röntgen rays.

The concomitance of acromegaly or dystrophia adiposis genitalia of Fröhlich with hypophyseal tumors is known and easily recognized, but of greater import is the fact that a large proportion of pituitary disorders produces no striking disturbance of growth or metabolism, particularly the more rapidly progressing types. The maximum symptoms in these are neurological, resulting from pressure upon surrounding structures. It is these latter types that I wish particularly to emphasize.

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*From the Department of Neuroendocrinology, Neurological Institute, N. Y., Dr. W. Timme, Director.

What then is noteworthy about the appearance of patients suffering from such tumors? They may show, in a much or less marked degree, some of the characteristics of the above types, e. g., a heaviness of bony structure, an anomaly of hair growth, spacing of the teeth, a coarseness of feature, or, conversely, a tendency to obesity, a fine feminine tendency to growth of bone and skin, slight retardation of sexual development with undescended testicle or scrotal implantation of the penis, menstrual disorders of the socalled functional type, or a mixture or any gradation of these. Alone these are suggestive but in combination with signs of pressure in the region of the sella turcica they are diagnostic. It is therefore of considerable importance to investigate minutely such minor physical signs and anthropological markings as present themselves on observation of the patient. Certain symptoms will also suggest a metabolic pituitary disorder, but these are frequently so vague and uncertain as to be rendered difficult of interpretation.

ANATOMY.

Let us review briefly the anatomical relations which are important to an understanding of the physical signs, placing particular stress upon the less frequently noted structures. The infundibular process of the hypophysis extending down from the tuber cinereum of the midbrain has surrounding it the diaphragm sellæ which is a prolongation of the dura bridging over the pituitary fossa. Anteriorly its important relationship with the optic chiasm is generally appreciated. Below it is separated only by the dorsum sella from the sphenoidal sinuses. Laterally the cavernous sinus, the third, fourth, and sixth cranial nerves, and the ophthalmic division of the fifth, are in more or less close relationship. Above, the stalk of the hypophysis arises from the tuber cinereum, posterior to which lie the corpora mamillaria, while laterally and above is the inferior temporal (olfactory) convolution. Further posteriorly and caudad is another important and less frequently recognized relationship, namely its close apposition to the interpeduncular space. This area is formed by the tuber cinereum and corpora mamillaria anteriorly, its floor by the substantia perforata posterior, posteriorly by the recesses posterior and pons, and its lateral margins are the pedunculi cerebri which run forward diverging laterally with the optic tracts partially surrounding them.

It is of note, therefore, that there are, in close relationship to the hypophysis, portions of the brain in which disturbance of function produces characteristic localizing symptoms and signs. Some of these form syndromes which we always refer to as pituitary disease, while others belong to conditions more frequently observed as belonging to lesions elsewhere.

The occurrence of pituitary symptoms accompanying tumors above or near the sella turcica and not involving the hypophysis directly is of considerable interest. Closely related to this problem is the recent experimental work by E. Leschke (1). Roussy's work is also of great importance here. He produced destructive lesions in the hypothalamic region of the diencephalon, that area below which the hypophysis lies, and his conclusions were as follows: "Alteration in the function of the diencephalon, especially the hypothalamus, may lead to important changes in the vegetative economy, showing themselves in the form of diabetes insipidus and mellitus, dystrophia adiposogenitalis, heat regulating changes, disturbance of pupillary reaction, hydrosis, and vasomotor activity." Confirmation of his work, which, when further elaborated, will throw much light upon the possible function of those important centres, has been obtained by Bailey and Bremer (2). The occurrence of clinical syndromes heretofore referred to the pituitary gland only, due to a lesion of the interbrain, throws a new light upon the interpretation of the symptoms of hypophyseal disorders in particular, and urges a word of caution upon the too enthusiastic reception of each new endocrine symptom. Are we then to consider that there is an endocrinous vegetative centre in the diencephalon or thalamic (subcortical) area whose structure, because we know it is not glandular, may be connected thereto through a sympathetic nervous chain extending into the midbrain or cortex? This has been suggested before and seems to be of considerable theoretical importance.

Upon the basis of these anatomical relationships the following neurological syndromes are found accompanying enlargement of the pituitary gland.

Anterior enlargement will cause pressure upon the optic chiasm with the familiar optic neuritis, optic atrophy, or a bitemporal hemianopsia, from interference with the fibres crossing at the posterior part of the chiasm.

Lateral pressure may involve some of the oculomotor nerves, resulting in strabismus, ptosis, or ophthalmoplegia and cavernous sinus pressure may cause an exophthalmos.

Pressure above upon the tuber cinereum and corpora mamillaria has not been productive of any reported typical syndrome in spire of the olfactory and gustatory function of these portions of the midbrain. It is close to the hypothalamic area, however, upon which the experimental lesions have been performed as pointed out above, and which has resulted in unusual pseudopituitary syndromes. Further pressure above might result in obstruction of the aqueduct of Sylvius with the development of an internal hydrocephalus and its accompanying symptomatology of headache, vomiting and papilledema.

The occurrence of socalled uncinate fits from upward and lateral pressure on the pituitary has for some time meant to us involvement of the inferior temporal lobe.

Should the pituitary enlarge posteriorly, the interpeduncular space will be involved and pressure upon one or both of the crura cerebri will occur with the resultant clinical picture of a contralateral hemiplegia or quadraplegia. Exaggeration of the reflexes, clonus, and plantar extensor (Babinski, Chaddock, etc.) responses will be obtained. This latter syndrome as part of the picture of a hypophyseal growth has seldom been noted, but in our clinic it has been brought to our attention a number of times. Cushing mentions that in large sella tumors there may occur spasticity, either bilateral or unilateral, from pressure upon the cerebral peduncles. In view of the rarity of this syndrome a case in point is reported.

A discussion of the anatomical and pathological status of the hypophysis is not complete without considering the sella turcica. In a previous paper, I have presented certain features of this problem, and since that time several other papers have been published which show the wide variety of sellæ turcicæ found in presumably normal individuals. Granted that the average measurements of a normal sella turcica are eight by ten mm., we have then a figure for comparison. The sella may be small or large, wide open or closed, eroded or smooth, but these factors only give us an indication of the size of the fossa which the gland can or does occupy and not the functional capacity of the gland substance itself. We know that the size of the thyroid is no indication of its thyroxin or iodine content, for a huge goitre may be seen with myxedema, or a normal sized thyroid with a hyperthyroidism; so also with the pituitary. Size is no criterion of its functional capacity, and acromegalic characteristics may be found with a normal sized sella, and hypopituitary symptoms with a huge fossa.

However, the evidence as obtained from radiographs of the sella turcica as to the status of the pituitary gland, though really not comparable, is of equal, if not greater importance, than that of basal metabolism determinations in thyroid disease. In pituitary growths the x ray is of course practically diagnostic inasmuch as intrasellar pressure will produce erosion or destruction of the clinoid processes and floor of the dorsum sellæ, the extent and direction of the enlargement being readily determined by the outlines of the pituitary fossa.

I should like to mention briefly an unusual type of case presenting signs of a neoplasm of the pituitary in which a normal sella turcica was found. These are in the main suprasella tumors, and their metabolic and structural changes are perhaps due to a functional disturbance of the hypophysis from regional pressure.

A stimulation of interest in the pituitary gland by the medical profession will result I hope in the more frequent examination of the sella turcica by the x ray and therefore a greater accuracy will be developed in the realm of hypophyseal diagnosis.

THERAPY.

It is not within the scope of this paper to undertake a discussion of the surgical treatment of sella tumors or the relative advantages of the transfrontal over the transsphenoidal route of approach; however, it is my feeling that the medical treatment might be stressed, and some points in particular brought to your attention which were determined at our clinic.

If I may be permitted to return to my analogy with thyroid disease, I should like to emphasize that medicinal methods of therapy, often of such satisfactory benefit to the hyperthyroid, are also most encouraging in pituitary enlargements, and should be stressed to their utmost possibilities before surgical treatment is attempted.

A careful observation must be maintained upon the visual fields and optic discs during the course of any medical treatment, and a retrogression indicating too great an increase in intracranial pressure or too great a pressure upon the optic chiasm, I consider the indications for operative measures.

It has been the impression of those interested in this field that, aside from neoplastic conditions involving the hypophysis, pituitary tumors do not arise *de novo*, but are enlargements of the gland of a functional type, chiefly hyperplasias or benign adenomata. This pathological state of the organ is usually due to a break in the complicated chain of internal secretory glands with deficiencies in the adrenals, gonads, and other glands, resulting in an attempt at compensation by an overactive pituitary body.

It then is rational therapy to give to the patient that gland which represents this deficiency and, in addition, pituitary substance itself, on the basis of supplying to the body metabolism sufficient pituitary from without thus making less demand upon the hypophysis itself. That this is borne out by facts is seen by the rapid amelioration of pituitary headaches upon administration of pituitary gland substance.

There are certain pituitary tumors which do not respond to oral administration of the gland. In these hypodermic injections of pituitrin (3), five to fifteen minims three times a week are often of avail. We have had one acromegalic patient in whom there was an incurable and inoperable pituitary growth whose only relief, even though temporary, was afforded by intravenous injections of pituitrin in saline. Pituitrin injection can therefore be considered an asset to our armamentarium in treating these hypophyseal disorders which, combined with the oral administration, seem to give the maximum therapeutic effect.

Before concluding the discussion of the treatment of this condition, brief mention should be made of the recent advances here and in France in radiotherapeutic methods. X ray application to the pituitary gland has been attempted with success both by the nasal and frontal route and the insertion of a small tube of radium in the gland substance through the sphenoidal sinus has been accomplished which, with improved technic, promises a large field of usefulness.

CASE REPORT.

For the sake of clarity one case report will serve to emphasize some of the more important points brought out in this paper. The patient has been under observation at our clinic and in the hospital for a period of almost four years. The case was reported before previous to the most interesting development and at that time was classified by Timme (4) as a case of subinvoluted thymus with an overactive pituitary from an attempt at compensation. The manner in which this compensation became pathological during a period of remission from treatment with consequent development of a tumor will be seen by the case history:

CASE.—Male, twenty-two (4). Six feet, three and a half inches in height, single, stenographer. Came to the Neurological Institute complaining of loss of memory and lack of sleep, feeling stuporous and extremely fatigued. Had had fainting attacks and headache, intratemporal in location. Was not able to do much manual work on this account and hence took a position as stenographer. Was exempt from military service, being the sole support of his mother.

While a child he was never strong. A long time was required for development, and on account of his feminine ways—was known as "sissy" to his playmates. He realized this appellation to be more or less just. He would cry easily if deprived of his way, and still does. Was always a bedwetter, and this weakness persisted to his nineteenth year. Realizing his feminine attributes, he endeavored to compensate for them by indulging in the most manly sports—boxing and football. But he was too slow to amount to anything there. He gave up the conflict and sank to his own recognized level—became a stenographer. He began to get headaches at seventeen years of age, at which time his excessive growth started.

Examination disclosed a man powerfully built. No hair on face or body except the pubic region, where it was of feminine distribution. The scrotum was divided above the penis into typical labial folds. He shaved once in two weeks. His pugnacious appearance was not borne out by his mental attitude. He cried when questioned about the simplest difficulties. His blood pressure was 100 systolic. He had the white line reaction of the skin, and his blood sugar was low. The x ray of the skull showed a sella in which erosion of the anterior clinoid was evident, and an excavation of the posterior portion of the floor. The x ray of the thorax showed a possible enlargement and persistence of the thymus. Neurological examination was negative.

The early history is that of a thymus state. The further progress, especially the headache, concomitant with the growth is suggestive of pituitary enlargement. This was partly borne out by the picture of the sella. His headaches became less frequent than they were, but his fatigability was marked. His growth seemed to have ceased. This case belongs to the third stage of the thymic adrenal-pituitary syndrome of Timme—with the giantism gradually reaching its acme, and the stuporous and drowsy mental condition of a dyspituitaric still present, with great fatigability, low blood pressure, and low blood sugar content. The enlargement of the sella turcica, however, gave promise of a gradual efficient compensation taking place. Feeding of whole gland pituitary extract within two weeks measurably improved his symptoms.

On a second admission to the hospital two years and three months later, he complained of dizziness, intratemporal headaches, nausea, vomiting, and staggering gait.

Physical examination revealed, height six feet, two inches, 7¾ hat, 15¾ collar, 11 shoe; he shaved twice a week; swaying station and unsteady gait, no change in reflexes.

On September 13, 1921, ophthalmoscopic examination by Dr. Ward Holden showed mobility, with fields and fundi normal. Blood pressure 96. Sugar curve .1 per cent., .14 per cent, and .125 per cent. Urine was negative. Wassermann test was negative. Treatment: Pituitary, half a grain, three times a day, after meals.

Although he was told to return once a week for observation, he disappeared for two months and then went to St. Luke's Hospital, where I saw him again. The examination revealed hyperactive knee jerks and Romberg present. Fundi showed bilateral edema of nasal half of each disc. The Wassermann test was negative. X ray by Dr. L. T. LeWald reported that the pituitary fossa was markedly enlarged both in anteroposterior and vertical diameters. There was erosion of posterior clinoid process.

He was referred back to the Neurological Institute where examination showed the following: Eyes, nystagmus to right and left; mobility normal; fields complete, dics showing moderate edema of nasal half of them (Dr. Holden). There was tremor of tongue, spasticity throughout, gait spastic and unsteady, no Romberg, ataxia, or asynergia. Reflexes: Arms, present, exaggerated, Klippel-Weil present, epigastrics and abdominals present and equal, cremasterics and bulbocavernosus lost, knee jerks exaggerated, tendency to ankle clonus and plantar extensor response obtained. Laboratory reports: Blood count normal, spinal fluid showed negative serology, sugar curve, .05 per cent., .095 per cent., .08 per cent.

On November 25, 1921, no headache or dizziness was reported; spasticity and papilledema unchanged. Treatment consisted of pituitrin, seven minims hypodermically every second day and varying quantities of pituitary by mouth.

The patient was discharged a month later with exaggerated reflexes and slight haziness of outline of nasal half of discs. He felt quite well. He was instructed to continue pituitrin injections, q. o. u., and take pituitary, one grain, by water, and report once a week. The patient disappeared and when again seen four months later he gave the following report. The medication had been followed out persistently and continuously and he was now entirely free from symptoms. He had no headache, dizziness, nausea, or spasticity of gait. The physical examination revealed normal visual fields and fundi; the papilledema had gone. Knee jerks and ankle jerks were not overactive, and there was absence of clonus, Babinski and Klippel-Weil.

Since that time he has been observed once in two weeks, and his status continues to improve.

We had the incipiency of a pituitary neoplasm presenting itself with a typical neurasthenic attitude and with vague complaints, doubts, and apparent psychoneurotic manifestations, but through all an undoubted symptomatology indicating an active polyglandular disorder. Under treatment he showed satisfactory improvement, losing his headache, growing hair, and bringing about a better adjustment. Then he disappeared, and on reappearing months after he showed moderate papilledema and evidence of spasticity of the legs, bilateral Babinski, and an enlarged sella turcica with marked erosion of the posterior clinoid process. Under hypodermatic injection of pituitrin combined with the oral administration, there was complete subsidence of the headache, and progressive improvement of his choked disc. After another disappearance for four months, during which time he took the treatment as outlined, he returned minus symptoms, minus papilledema, minus exaggerated reflexes, in which state he has remained for more than six months. He is now returning to work, and if his desired occupation, namely that of a policeman, is any indication of the amount of recovery from his former effeminate habits, we can feel quite satisfied with his progress.

This case presents persistent thymus with attempts at compensation by the pituitary. The latter became so pathological that an adenomatous or hyperplastic glandular mass formed of such proportion that it eroded and enlarged the sella turcica, especially posteriorly, and pressed upon the cerebral peduncles causing spastic gait and exaggerated reflexes. In addition there was general increased intracranial pressure with papilledema as a manifestation of this. Oral pituitary feeding did not produce much abatement of symptoms, but hypodermic pituitary did so to such a degree that he is now entirely free from his intracranial signs and symptoms.

CONCLUSIONS.

The intimate and important keystone position which the hypophysis occupies in the cranial cavity and its close relationship to easily localized structures in and about the interpeduncular space, make the presence of a tumor noticeable because of the pressure symptoms it produces.

In spite of the general belief that pituitary tumors must have visual disturbances, some of the largest observed on autopsy have shown none of these, and one can easily conceive of a growth enlarging either laterally or posteriorly which will completely avoid the optic nerves. Posterior enlargement of the pituitary will result in signs of pressure upon the pyramids with exaggeration of reflexes, extensor plantar responses, and spasticity.

X ray examination of the pituitary region is of prime importance in the diagnosis of disorders of that gland and the increased observation of sella turcica radiographs will show a proportionate increase in the diagnosis of hypophyseal disease, especially tumors.

The case reported in full as representative of a type of pituitary enlargement producing increased intracranial pressure and bilateral interference with pyramidal function has cleared up under treatment.

The treatment urged which is most likely to produce the maximum effect in hypophyseal tumors is a combined oral and hypodermic administration of pituitary substance.

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74 West Forty-eighth Street.

Pituitary Tumors

By FRANCIS C. GRANT, M.D.,
Philadelphia.

In any consideration of conditions involving the hypophysis, the anatomical position, embryological origin and histological structure of the gland must be fully understood. The pituitary body, closely surrounded by a sheath of dura and connective tissue, lies deep in the recess of the sella turcica on the base of the skull. This cavity is roofed in by a dural sheath, the diaphragma sella, which is attached to the anterior and posterior clinoid processes. Through this sheath passes the infundibular stalk connecting the posterior lobe of the pituitary to the tuber cinereum and brain. Any expansion of the gland is therefore but slightly limited above and laterally, but meets bony resistance below.

Embryologically the anterior portion of the organ is derived from an invagination of oral ectoderm. Rathke's pouch, a connective tissue septum containing a multilocular cleft and lying between the anterior and posterior lobes of the gland, is a remnant of this invagination. In the tissues lying between the pharyngeal mucosa and the base of the sella, careful histological examination has shown the presence of a residue of squamous epithelium, and even of areas of glandular tissue closely resembling in structure the anterior lobe. Leegard (1) has recently demonstrated a retropharyngeal tumor made up of tissue similar in structure to the anterior lobe of the pituitary. From these epithelial and glandular rests (accessory hypophyses) tumors and cysts may arise, and it is suspected that the glandular tissue by hyperfunction may set up a clinical syndrome closely resembling pituitary disease. The posterior lobe or pars nervosa is formed by an extension downwards of glial tissue from the floor of the third ventricle and the tuber cinereum. The stalk of the pituitary is a thin strand of nervous tissue connecting the posterior lobe to the base of the brain. The stalk carries down with it the infundibulum, a continuation downwards of the third ventricle, and the blood supply to the anterior lobe. The blood supply to the posterior lobe leads directly into it by three small twigs from the internal carotid artery. The posterior lobe and stalk are surrounded by a thin epithelial layer which is continuous with and derived from the sheath of the anterior lobe. This epithelial capsule is particularly well developed where it lies between the anterior and posterior lobes. Its structure is so definite and its epithelial cells give such plain evidence of physiological action that this area is designated the pars intermedia.

The histology of the pituitary is difficult, the exact significance of many of the details brought out by various staining reactions still under dispute. The structure of the anterior lobe is relatively simple, columns of cells supported by definite fibrous tissue trabeculations and surrounded by large sinusoidal spaces into which the numerous arterioles supplying the gland freely empty. Flesch (2) and Dostojewsky (3) showed that there were two main types of these cells, chromophile and chromophobe, in this lobe. Schoneman (4) divided the chromophile type into acidophile and basophile cells, according to their staining reaction. As a result of his investigations Benda (5) considered these two cell types to be transitionals from the same parent cell. Scaffidi (6) asserted that they were separate and distinct in origin. Kraus (7), on the basis of a careful study, distinguished between granular (basophilic, eosinophilic and pregnancy cells) and nongranular cells, transitional cells, nerve cells and cells which have lost their granules. He believed that the eosinophilic variety develops directly from the reserve cells, while the basophiles spring from these same cells but may have larger nongranular homologues in the pars intermedia as an intermediate stage. The work of Bailey (8) is in accord with Kraus's findings. Apparently the cell types change with the growth of the individual; chromophobe cells predominate in the fetus; the chromophile cells gradually increase in number and at middle age are equal in number to the chromophobe. Even as to the position of the cells throughout the gland structure observers differ. Cushing (9) says that "the acidophiles are as a rule more abundant in the center of the gland, where they tend to line the sinuses; the basophiles occupy the periphery." Tilney (10) on the other hand states "that a large triangular area situated dorso superiorly is made up almost exclusively of acidophilic cells, while an even larger area situated below and to the front comprises quite as exclusively the basophilic elements. In addition to this discreet distribution, a narrow band of basophilic cells encircles the entire glandular portion, becoming somewhat attenuated as it passes beneath the acidophilic area. The bloodvessels are especially numerous in the areas where acidophilic cells predominate. Colloid masses are particularly numerous in basophilic areas, especially in apparent acini in peripheral and central zones." Lewis (11) observed granules in the cells most markedly on the side towards the blood sinus, a finding common in glands of internal secretion.

Of the structure of the pars intermedia Ewing (12) says "the cells lie in small groups surrounded by connective tissue. Often they form alveoli of cubical or cylindrical cells surrounding colloid globules and have a close relation to the blood vessels. The cytoplasm is clear, chromophobic, and lacking in specific granules."

The pars nervosa consists of a loosely placed meshwork of neuroglia cells. Roughly their fibres radiate towards the infundibulum. The histological structure of this area offers no bases of explanation for the well known physiological properties of solutions of this lobe of the gland. Dandy (13) has demonstrated sympathetic nerve fibres running down the infundibulum. These fibres may be secretory in function; and cellular detail which our staining methods cannot bring out might suggest an explanation for the physiological action.

From even this inadequate outline of the normal histology of the pituitary, the fact may be grasped that possibilities for pathological development are many and their diagnosis difficult. Even more difficult is it to connect the clinical picture with the microscopic findings over a series of cases. Four facts stand out predominantly. Pathological changes in the anterior lobe lead to changes in the bone skeleton, gigantism or dwarfism; involvement of the posterior lobe produces increased sugar tolerance and decreased basal metabolism or Fröhlich's syndrome of increased fat deposit, infantilism, metabolic and blood pressure disturbances. Diabetes insipidus is also seen. Combinations of anterior and posterior lobe symptoms may be noted. Lastly, pituitary lesions may be present which can be diagnosed by x ray or visual field changes alone without any of the symptoms usually attributable to pituitary pathology being present.

Hyperplasia of the anterior lobe of the pituitary occurs physiologically during pregnancy, and persists for some time after delivery. Subsequent pregnancies produce an increasingly pronounced hyperplasia. As the work of Erdheim and Stumme (14) showed, this functional hyperplasia affects the chromophobe cells. These cells multiply by mitosis, form large solid groups with fine granules in the cytoplasm and may progress to the formation of multiple focal adenomata. The acidophile elements are pushed away from the sinusoidal spaces which they normally tend to line and no longer dominate the picture. It may be many months after gestation before the acidophile cells regain their numerical preponderance in the field. The gestational hyperplasias may become sufficiently large to cause neighborhood symptoms, visual defects and changes in the size and shape of the sella. Infectious diseases and endocrine disturbances may cause such hyperplasias. Such for example was the case of cretinism and myxedema reported by Eichhorst (15) with hyperemia and hyperplasia of the anterior lobe of the pituitary followed by atrophy, connective tissue overgrowth with cyst formation and shrinkage of the gland. What are apparently gestational hyperplasias have been reported consisting of chromophilic elements. As a general rule chromophobe struma of the anterior lobe is not connected with the clinical picture of acromegaly, but produces neighborhood pressure symptoms without marked endocrine disturbance. Complete or almost complete destruction of the anterior lobe by gumma or tubercle is not connected with any marked hormonic syndrome, certainly with no acromegalic features. Von Monakow (16) recently reports a case of destruction of practically all the pituitary except the posterior lobe. The pathogenesis of the lesion was not clear. Clinically the case presented an atypical Fröhlich's syndrome plus marked mental apathy and a great decrease in the urinary output. Fahr (17) reports a case of almost complete replacement of the anterior lobe of the pituitary by fibrous tissue. Posterior lobe showed no changes. A clinical picture resembling Addison's disease was produced. Simmonds (18) reports four cases of myexdema in which the only pathological finding was complete destruction of anterior lobe of hypophysis by fibrosis.

Eosinophilic hyperplasias on the other hand do seem to be very definitely connected with acromegalic change. In carefully studied cases the evidence favoring this clinicopathological picture is convincing. To be sure, cases can be produced controverting this statement. For example, the case of Yamada (19), where acromegaly existed without pituitary pathology, the cases of Cagnetto (20) and Zak (21), where an enormous eosinophilic increase occurred without acromegaly, and the recent series reported by Bailey (8), where the patients whose glands showed the greatest eosinophilic hyperplasia had few clinical signs of acromegaly, and a definitely acromegalic case showed no eosinophilic hyperplasia on microscopic examination. When one remembers, however, the grouping of the cellular elements in certain areas of the gland, that these studies are made for the most part from fragments of the gland removed surgically and also the fact that the accessory or pharyngeal hypophysis may hyperfunction and cause hyperpituitary symptoms in the absence of any manifest change in the pituitary itself the reasons for the failure of the clinical and histopathological picture to coincide in every case becomes more clear.

Apparently it is not possible, by microscopic examination of a specimen from an hyperplastic gland, to determine positively whether the hyperplasia is still an active process or whether it has reached its full extent and is receding. This is of course important from a prognostic point of view. In a study of the cellular mitochondria Bailey (8) could not determine any relation between the numbers seen and the degree of hypersecretion of the gland. The more acute cases of pituitary disturbance seemed to show more mitochondria in the cells, but he could not establish any conception of the degree of hypersecretion from their presence.

While chromophobe and eosinophile hyperplasia of the pituitary are common, basophile or mixed basophile and eosinophile hyperplasia are very rare. The possibilities of error in diagnosing pituitary hyperplasia are many. Benda (22) in examining different areas in a case believed to be simple hyperplasia reported fields resembling typical adenoma, carcinoma and angio sarcoma. Myer (23) in a similar condition found areas suggesting the normal hypophysis, gliomatous tissue, sarcoma and plugs of hypophysis cells resembling carcinoma. A careful study should be made before a diagnosis of sarcoma of the pituitary is reached. Staining reactions will show the presence of granules in pituitary cells which are absent in sarcomatous tissue. A sarcoma will give rapid metastasis and show many intracellular mitotic figures. Pituitary sarcomata, when present, are almost always extrasellar growths, invading the gland from without and causing symptoms by external pressure. A majority of the tumors reported in the literature as sarcoma, angiosarcoma, adenosarcoma, spindle cell or round cell sarcoma on careful examination and staining would now be termed carcinoma. All pituitary hyperplasias can undergo adenomatous and cystic change. Carcinomatous degeneration may follow. Such glands are usually large, the capsule is ruptured, sella erosion occurs, metastases may be noted in the surrounding brain or invading the sinuses and nares. The cellular arrangement is atypical with mitotic figures, increase in vascularity and colloid material, a similar picture to that presented by carcinoma in other areas. As the tumor grows, if colloid secretion is profuse throughout, myxomatous softening, central necrosis, hemorrhage and cyst formation ensue. Calcification may occur in the cyst wall and be of important diagnostic value in the x ray findings. Gumma involving the anterior lobe alone is relatively rare. Metastatic growths apparently very infrequently involve the anterior lobe. Possibly its blood supply is so free that tumor cells do not easily lodge in it.

Tumors whose origin can be connected definitely with the pars intermedia are rare. As soon as a growth attains any size it is difficult to be certain whether it springs from this narrow band of tissue or from the adjacent lobes. The cell types composing the tumor are of little aid in determining this. Ewing (24) notes three cases. In only one, a large adenoma composed of structure resembling thyroid tissue, is a pathological diagnosis made. Weber and Schmidt (25), and Goldzieher (26) also report an adenomatous type of tumor springing from this area.

The posterior lobe of the pituitary seems to be more often involved in metastatic growths than to be the primary seat of a tumor. In a study of diabetes insipidus Mottram and Kennaway (27) collected a series of such cases. Carcinomatous metastasis to the posterior lobe alone without involvement of the remainder of the organ may follow mammary and pulmonary cancer. Melanosarcoma involving the base of the brain and posterior pituitary lobe was reported by Fleckseder (28). Few cases of tumor primarily originating from the posterior lobe are to be found. Ewing (29) quotes Bury, and Roxbury and Collis as having demonstrated gliosarcomas. Weichselbaum (30) reports two small lipomas replacing the posterior lobe.

Duffy (31) in a careful and comprehensive report of the literature, finds fifty-five cases of tumors arising from the remnants of the hypophyseal duct. Since this paper Bailey (32) has given an account of one more, making fifty-six in all. These tumors are found in the midline just behind or below the optic chiasm and usually fill and distend the sella. A connection with the infundibulum may be demonstrated in all tumors of small or moderate size. Hypophyseal duct tumors must be distinguished in the first place from cholesteatoma, and secondly, from growths springing from the choroid plexus. Erdheim (33) claimed that cholesteatoma contained keratohyalin granules while hypophyseal tumors did not. Bailey (32) claims that the latter type also contains these granules. Basal cholesteatoma and dermoids arise probably from epithelial rests carried in with the closure of the cerebral vesicles. These growths rarely lie in the midline and are often situated below the tentorium. In ependymal tumors the growth is from behind forwards through the third ventricle, and an attachment to the choroid may be noted.

Erdheim has collected thirteen cases of cholesteatoma, none of which seemed to be connected with the pituitary, and only a few were situated in the midline. Lockwood (34) has recently reported a case of midline tumor connected with the hypophysis which showed cholesteatomatous cysts and compensatory hyperplasia of the pituitary cells.

Duffy (31) classifies hypophyseal duct tumors as follows: 1. Simple papillary cyst or intracystic papilloma with intracystic cauliflower papillomatous structure. These intracystic papillary tumors are the simplest in structure and, save when they have broken through the floor of the sella by pressure, retain the simplest characteristics; the cyst wall usually shows no invasion. 2. Simpler and more complicated calcified and uncalcified adamantinomas, including the autochthonous teratoids of Ewing. These tumors show local invasion or localized carcinomatous degeneration but do not metastasize. The largest number of tumors belong in this group. 3. Group showing all the earmarks of malignant spinal cell carcinoma with extensive metastasis. These tumors are usually suprasellar and extrasellar. They are frequently accompanied by the adiposogenital syndrome and the early appearance of primary optic atrophy. The frequency of calcifications in their walls makes x ray diagnosis relatively easy.

Tumors involving the whole pituitary are fairly common. Good and Ellis (35) report an hemangioendothelioma with destruction of most of the gland. A clinical picture of myexdema was produced. Froboese (36) details the complete destruction of the entire organ by a tuberculous process. The patient died in coma. Curiously enough hypophyseal tuberculosis occurs almost always in women. Gumma of the pituitary is also seen.

From this mass of conflicting data, what facts may be deduced which will make a knowledge of the pathology determined by frozen section, immediately upon removal of the tissue, of value to the surgeon at the operating table? In the transsphenoidal approach it is important to know whether the tissue encountered is normal anterior lobe pushed forward into the operative field by a tumor behind it, or whether the tissue is hyperplasia or malignancy of the anterior lobe. If a cyst is encountered it is vital to know what the structure of its wall may be. If the tissue is normal anterior lobe the surgeon must take steps to avoid removing or damaging it. If the cyst wall contains squamous epithelial cells the operator is sure that the cyst is extraventricular and originates below the ventricle. He may puncture it without entering the ventricle. Knowledge of the type of tumor may tell us whether or not it is suprasellar and what the effect of radium will be. But it is only by careful study of these growths, a realization that sections must be cut and examined from every part of the tumor so that no area is overlooked by a search for and consideration of an actively functioning accessory hypophysis and by a closer correlation between clinical study and surgical and postmortem findings, that any progress will be made in interpreting many of the apparent contradictions which arise in an attempt to compare pathological and clinical findings.

2201 ST. JAMES PLACE.

References will appear in author's reprints.

The Endocrines in Uterine Hemorrhage

By WILLIAM LINTZ, M.D.,
Brooklyn,
Clinical Professor of Medicine, Long Island College Hospital, Physician in Chief Bikur Cholin Hospital.

INTRODUCTION.

I wish to relate my experience as an internist in the successful treatment with endocrine glands of certain types of uterine bleeding. All these cases were first carefully studied by the gynecologist and the existence of any operable condition excluded. In some of these cases the gynecologist advised operation but the patient refused. In this group of patients belong the persistent uterine bleeding at the climacterium, from the fibroid and subinvoluted uterus. Practically all of these patients were first treated by the gynecologist without relief, or in some instances would not carry out the indicated treatment; it was only then that the endocrine treatment was undertaken. The endocrines used were extracts of thymus, mammary and placenta.

RATIONALE OF TREATMENT.

In dealing with the endocrinological phases of this problem I will touch only that which is universally accepted as proved and well established. Normal menstruation is part of the phenomenon resulting from the interaction of the hormones from the ovaries, pituitary and thyroid glands. The corpus luteum is so closely associated with the rhythm of menstruation that it undoubtedly exercises an important control of this function. As long as there is an adequate and harmonious interaction of these glands the woman bleeds from the uterus, rhythmically and in a definite cycle, the bleeding being moderate in amount. However, should the ovary, the pituitary, or in certain cases the thyroid oversecrete, then metrorrhagia and menorrhagia are very likely to ensue. The thymus gland is antagonistic to the gonads, and it is only at puberty when the thymus recedes that the gonads assume their full function and menstruation begins. It is a well known fact that a persistent and active thymus inhibits the early development of the gonads, and that an early regression of the thymus favors the early function of the gonads. Conversely, hypoplastic ovaries may indicate a persistent thymus, while hyperplastic ovaries indicate a retrogressed thymus. Bleeding from the uterus is checked during pregnancy, lactation, and at the climacterium. By what process does this occur? The trophoblast, chorion, and subsequently the placenta check the uterine bleeding during pregnancy. The mammary glands acting on the uterus, ovaries, posterior lobe of the pituitary, and the related glands check uterine bleeding during lactation. The uterine contractions felt by the mother while nursing her child are too well known to need any comment. At the climacterium the gonads atrophy. The vegetative nervous system is closely connected functionally with the endocrine glands.

TYPES OF CASES.

The patients treated may be classified in five groups.

Group 1.—In this group belong married and unmarried women, as a rule young in age, who on physical examination show nothing abnormal. They complain of nothing but menorrhagia or metrorrhagia or both. However, upon questioning these patients closely, symptoms indicative of a disturbed endocrine function can invariably be elicited. Most of the cases treated belond in this group. Of the married women, some had children, others were sterile. The bleeding in some was very profuse and the duration of this condition in others was a matter of years. Yet there was nothing in the pelvis, as far as could be ascertained, to account for this condition.

Group 2.—Subinvolution of uterus as for example bleeding following curettage of the pregnant uterus without retention of fetal products.

Group 3.—The bleeding which occurs in some women at the time of the climacterium. The diagnosis made as a rule in these cases is fibrosis (?) of the uterus.

Group 4.—Cardiovascular disease with nephritis and associated with hypertension.

Group 5.—Uterine bleeding in cases showing disease of the ovary, the bleeding persisting after the removal of the pathological condition.

ILLUSTRATION OF GROUPS.

Group 1.—The women in this group all show definite endocrine disturbance, usually hyperthyroidism. Some show symptoms indicative of dysfunction of the pituitary; otherwise their history is absolutely negative.

Group 2.—Mrs. A. S. was admitted to the hospital October 8, 1921, complaining of severe and continuous uterine bleeding of one month's duration, with clots, weakness, pain in lower abdomen, fainting spells, headache and dizziness. With the exception that the patient suffered from influenza and pneumonia three years ago, her past history was negative. Shortly after her attack of influenzal pneumonia typical epileptic attacks developed, and on the day of admission to the hospital she had several attacks. On September 8th, one month prior to admission, a dilatation and curettage for the interruption of pregnancy was performed. This was the cause of the bleeding. On September 20th she was removed to a hospital, curetted, but no retained product of conception was found. She remained there for five days during which time everything possible to stop the bleeding was done, but without results. While at home large doses of morphine, ergot and pituitrin and all sorts of local treatment did not control the bleeding.

Physical examination showed a young woman poorly nourished, very sick in appearance, with extreme pallor of the skin and mucous membranes, with slight hypertrichosis of upper lip and a palpable thyroid. The heart sounds were rapid, weak, and of poor muscular quality. Everything else was negative. A gynecological examination presented a profuse uterine discharge, with an enlarged, soft, slightly tender uterus, otherwise negative. She was given by mouth mammary, placental and thymus extract, each fifteen grains three times a day. Each day the bleeding became less until on the fourth day it practically stopped and all the symptoms gradually disappeared. On the seventh day after admission she passed two large clots (old?) and stained slightly and then the bleeding stopped. She appeared remarkably well in appearance. The epileptic attacks continued for three weeks and then stopped. Pelvic examinations at different periods showed that the uterus was becoming smaller and firmer and that the tenderness was disappearing till it became normal. She was discharged perfectly cured. The treatment consisted only of the above named glands. I saw the patient three and a half months later. She was perfectly well; had had no more epileptic attacks.

Laboratory findings: Urine—chemical, cytological, Mosenthal and phenolsulphonephthalein tests were negative. The hemoglobin varied from 70 to 75 per cent. (Sahli); red blood corpuscles, 3,020,000 to 4,000,000; white blood corpuscles, 6,400 to 8,400; polymorphonuclears, 60 to 73 per cent.; lymphocytes, 27 to 40 per cent.; coagulation time on four different occasions, 4 to 5 minutes. Wassermann test was negative. Blood chemistry—sugar 0.135 per cent., creatinin 2.0 mgms., nonprotein nitrogen 27 mgms., urea 12 mgms., CO_2 50. Sputum and feces were negative. The blood clots were examined histologically repeatedly for evidence of conception or malignancy, with negative results. Blood pressure varied from 95/50 to 120/60, temperature from 99 to 100, respiration from 18 to 26, and the pulse from 70 to 85.

Group 3.—Mrs. C. M., forty-four years of age, was admitted to the hospital on August 31, 1921, complaining of severe menorrhagia, metrorrhagia, abdominal pain, headache, and weakness. Family, previous, personal, venereal, and obstetrical histories were negative. Menstruation began at fourteen, occurred regularly every twenty-eight days, lasting seven to eight days, bleeding very profuse, dark, with clots, and exceedingly painful. The present illness began on August 17, 1921; the patient flowed very profusely for seven days, the discharge being full of clots. Then she had amenorrhea for two days when bleeding reappeared even more profusely, accompanied by severe abdominal and pelvic pains. Physical examination showed a well nourished woman with a moderate anemia of skin and mucous membranes and weighing about 180 pounds. Heart, lungs, liver, spleen, kidneys and lower extremities were negative. There was a painful area over right hypochondriac region and lower abdomen. A pelvic examination revealed a tender fibrotic uterus whose cervix was lacerated and from which a profuse dark bloody discharge was flowing.

Treatment had been as follows: Hydrastis, fifteen minims, three times a day; an ampoule of pituitrin three times a day; placental extract, five grains, three times a day; ice bag to lower abdomen and packing. After five days of this treatment bleeding continued just as profusely as before. To rule out malignancy, a curettage was performed by Dr. Ralph Beach. Microscopic examination showed no malignancy. On September 14, 1921, after bleeding for nineteen days, the patient was placed on thymus, mammary and placental extract, five grains of each three times a day and all other medication stopped. Next day she bled as much as before. In the next three days the bleeding diminished until on September 30th she only spotted. On the 21st the bleeding stopped completely and did not reappear. Two months later at the time of expected menstrual period, she had a normal menstruation. Laboratory findings: Urine was negative. Blood—hemoglobin, 65 to 70 per cent.; red blood corpuscles, 3,500,000; white blood corpuscles, 14,000; polymorphonuclears, 65 per cent.; lymphocytes, 35 per cent.; coagulation time six and a half minutes. Wassermann was negative. Temperature, 99° to 99.6°; pulse, 85 to 95; respiration, 18 to 20; blood pressure, 120/60.

Group 4.—Mrs. A. S., forty years of age, was admitted to the hospital on August 22, 1921, complaining of dyspnea, orthopnea, palpitation, polyuria, nocturia, and at times dysuria, headache, dizziness, nausea and vomiting, edema of lower extremities, and nonproductive cough. Family, personal, venereal and past histories had no present bearing on the case. Menstruation began at ten years and occurred every twenty-eight days, duration eight to ten days, painless, less in amount and irregular during the last two years. She had had four children and five miscarriages. Physical examination showed a middle aged woman, with pyorrhea. Heart was enlarged to left anterior axillary line, regular, sounds of poor muscular quality, first aortic roughened and presented a soft blowing systolic, second aortic decidedly accentuated. Lungs showed signs of congestion at both lobes and edema of lower extremities. Everything else was negative. The patient had been menstruating since August 19th. Gynecological examination revealed a lacerated cervix and a moderately enlarged uterus. Temperature, pulse and respiration were normal. Blood pressure was 250/130. Laboratory findings: Urine, specific gravity 1.016; albumin, moderate amount; moderate number of hyaline and granular casts; otherwise negative. Mosenthal test, day output 500 c. c., specific gravity varying from 1.003 to 1.017; night output 700 c. c., specific gravity 1.010. Phenolsulphophthalein test, first hour four per cent., second hour sixteen per cent., total twenty per cent. Blood: hemoglobin, 75 per cent.; red blood corpuscles, 4,000,000; leucocytes, 7,000; polymorphonuclears, 77 per cent.; lymphocytes, 23 per cent. Blood chemistry, sugar 0.14 per cent., creatinin 1.5 mgms. Wassermann negative. Sputum and feces were negative.

Treatment consisted of phlebotomy, hot packs, colonic irrigation, cathartics, diuretin and digitalis. The patient improved remarkably and the blood pressure dropped to 170/100 and stayed there. Menstruation ceased on August 24th. On August 29th she began to bleed profusely day and night. Blood pressure was then 170/100. Large doses of ergot, ovarian extract and local treatments had no effect. Bleeding continued, discharge was dark and full of clots. On September 8th she was given by mouth mammary, placenta and thymus gland, ten grains three times a day. On September 9th the bleeding had somewhat diminished, and on the tenth day it was still less and there were no clots. In the next three days she was only spotting and in the following two days all spotting ceased. When discharged on September 22d there was no uterine bleeding and her general condition was greatly improved.

Group 5.—Mrs. A. B., aged fifty-six, was admitted to hospital on August 25, 1921. She had complained for the last twenty years of progressive abdominal enlargement, frequency of urination, constipation, headache, progressive weakness. For the past six months there had been severe menorrhagia and metrorrhagia with abdominal pain. The family, personal, past, venereal and obstetrical histories were negative. Menstruation began at fourteen, was regular, every twenty-eight days, moderate in amount or profuse at times, lasting six to seven days, and slight dysmenorrhea. Physical examination showed a patient weighing two hundred pounds, with marked hypertrichosis over upper lip. Heart was somewhat hypertrophied and its sound distant and faint. Lungs showed a few crepitant râles and diminished breathing over both bases. Liver was enlarged three finger breadths below the right costal region. Abdomen was very large and overhung to middle of the thighs. Over lower half of abdomen a smooth round hard mass was palpable which on percussion was dull. From the uterus there was a bloody discharge, dark and full of clots. Temperature, pulse and respiration were negative. Blood pressure was 210/100. Laboratory findings: Urine, faint trace of albumin, otherwise negative. Blood, hemoglobin, 75 per cent.; red blood corpuscles, 3,500,000; white blood corpuscles, 9,000; polymorphonuclears, 78 per cent.; lymphocytes, 22 per cent.; coagulation time five and a half minutes. Wassermann was negative.

As the bleeding was very profuse on August 30th a nine pound ovarian cyst with a twisted pedicle was removed by Dr. G. I. Miller. The operation also revealed an enlarged fibrotic uterus, a general visceroptosis and a marked diastasis recti. The blood pressure came down to 170/100 but the uterine bleeding continued just as profusely. Ergot and pituitrin in large doses were of no avail. Twenty-one days after the operation (September 20th) placental, mammary and thymus extracts, ten grains each, three times a day, were given. The next day the bleeding was just as profuse. On September 22d the bleeding lessened slightly and the clots were fewer. On the 24th the bleeding was markedly diminished. On the 25th, 26th, 27th she was only spotting, and on the 30th it stopped completely and did not reappear.

From the cases cited above we see that in this group the uterine bleeding is a purely endocrine phenomenon, that the administration of endocrine glands is physiological and rational, and that their effectiveness in this condition may be logically expected. Quite frequently in uterine bleeding it is almost impossible to point out definitely which one gland is at fault, and even if this was possible, while this malfunction may be primary in one gland—say the ovary—yet in most instances its relation to the thymus, thyroid, and pituitary is so close that the result is secondary. For this reason, as well as for the physiological nature of the problem as considered above, I deem it advisable, in the treatment of these patients, to combine the thymus, placental and mammary extracts.

GENERAL REMARKS.

It will be observed that there were earmarks of endocrine disturbance in every one of the cases illustrating the groups. Not infrequently some of these patients are hysterectomized, the x ray or radium being used. Some of these patients I have seen and watched for years. While in certain instances this treatment is very successful, in others, even if the bleeding is completely controlled, the patient suffers from the endocrine disturbance of which the bleeding is only a symptom. The uterus and ovaries are not always the primary cause of the bleeding but rather the secondary. This is illustrated by the patient representing Group 4. She began to menstruate at ten, which would indicate an early retrogression of the thymus, and had five spontaneous miscarriages, an indication of an overactive pituitary. Sometimes this treatment fails in types of cases where we have a right to expect good results. Why this is so I do not know. The dose varies with the severity of the case, ranging from five to twenty grains of each of the endocrines three times a day. It is advisable to continue the medication in smaller doses for some time after cessation of all bleeding. Are the results lasting? In some instances, yes; in others, no. A week before the expected menorrhagia give small doses of the endocrines and in some instances throughout the period of menstruation.

CONCLUSIONS.

1. The endocrines are chiefly responsible for certain types of menorrhagia and metrorrhagia.
2. Such cases are favorably influenced by the extracts of endocrine glands.
3. The thymus, placenta, and mammary organs are physiologically antagonistic to the endocrines producing uterine bleeding.
4. The combination of extracts of these three glands is more effective.
5. Surgery, x ray, and radium, though they may stop the bleeding, do not cure the patient.
6. The treatment is absolutely harmless.

1352 Carroll Street.

The Endocrines in Otolaryngology*

By SAMUEL M. WILSON, M.D.,
Philadelphia.

The subject to which I invite your attention lies in the borderland between otolaryngology and general medicine. A certain amount of general treatment is frequently necessary to assist in reducing intumescence, to cause absorption of exudates and after operations to favor healing with a minimum of scar tissue. Some of the socalled endocrines appear to help in this manner. The success of operations, or other measures which we have adopted, may depend on the action of these remedies, therefore personal supervision is necessary for their successful use. In neurotic conditions we recognize the nasal intumescence, rhinorrhea and asthmatic seizures as merely an annoying and conspicuous part of a general vicious circle in which the erectile tissue of all parts of the body is involved. Skillful treatment of the nasopharynx will give prompt relief of distant symptoms having no apparent connection with the nasopharynx. Local treatment relieves intumescence. Pressure will require resection of the septum or turbinates.

The lack of vascular tone, however, previously manifested in so many ways, is improved to only a slight degree and prevents a complete cure, no matter how thorough the local treatment may be. The condition seems to recur. The subjective symptoms continue and endocrine treatment is necessary to relieve these.

When intumescence is present pituitary extract representing from one third to one half grain of the gland, combined with an equal amount of the chloride of sodium, is an average commencing dose for an adult. It materially helps to relieve the sinus conditions secondary to engorged turbinates and the sleeplessness, headaches and mouth breathing induced by them. The administration must be continued for a considerable time.

Similarly, a hypodermic injection of six or eight minims of pituitrin and one or two of adrenalin will frequently relieve extreme hoarseness, when due to this condition and will maintain the effect for about twenty-four hours or more.

Only after a thorough shrinking with cocaine can we determine whether an obstacle exists which will require surgical removal, treatment by other means being a mere waste of time. It is evident that although the glandular treatment is mentioned as affecting curative changes in several conditions, it is only as an adjuvant to the measures commonly used when the glands are omitted. Hypodermic injection is better than administration by the mouth, two or three in the week being sufficient in most cases. The subject is such a prolific one for debate and for the expression of contradictory opinions among those who have made a scientific study of it, that an attempt to explain the underlying principles seems useless, but an important action appears to be their aid in supplying a deficiency of one or more of the salts of the mineral earths. Calcium is commonly mentioned in this connection, but it quite frequently seems that magnesium, potassium or sodium is the one required. Probably an ionization takes place, for only a small quantity is required to cause improvement.

After such an operation as a sinus exenteration healing may be slow and accompanied by excessive scar tissue. In this, thyroid therapy is worthy of trial; at first in a small dose, such as one quarter of a grain of the gland. If well borne, the dose is increased. In streptococcic pharyngitis and in the enlarged cervical glands that accompany some infections of the nasopharynx and sinuses, lymph gland in five grain doses has a satisfactory effect. Like thyroid with which it may be beneficially combined, it will in susceptible patients induce symptoms of thyroid intolerance, necessitating its temporary withdrawal. When prescribing this treatment for adenitis, it is advisable to withdraw it temporarily as soon as any diminution in the size of the swellings is noted and to substitute codliver oil. After a few days, if resolution is not proceeding too rapidly, the thyroid and lymph gland may be resumed, the oil being continued.

Treatment with lymph gland will usually cause a reduction of simple thyroid enlargement, as does treatment with thyroid gland and, as announced by

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*Read March 15, 1922, before the Otolaryngological Section of The College of Physicians of Philadelphia.

Hugh Ashby in 1913, it will reduce to normal most cases of chronic enlargement of adenoids and tonsils, with a corresponding improvement in the health of the patient. It has been suggested that hypertrophy of tonsils and adenoids is not usually a primary pathological condition, but the effort of the system to combat such a one. Whether or not this view is entirely correct, there is reason to believe that treatment of the nasopharynx will usually lead to improvement. As is so likely to occur after a tonsillectomy, a patient who has suffered from rheumatism is apt to develop a light attack of that disorder while being treated with lymph gland.

Pituitary, given intravenously with a small dose of adrenal, is probably the most prompt, reliable and powerful stimulant of the heart and circulation at our command. It acts well in surgical shock and in influenza, the effect of a single dose may be maintained for as much as thirty-six hours.

Instead of being contraindicated in hemorrhage, it is useful in that condition, especially if the bleeding comes from an oozing surface, as during tonsillectomy or a nasal operation. Potent for good, an overdose may cause alarming symptoms, prominent among which is air hunger. Any one undertaking its administration should know this and that the symptom will subside if the patient remains recumbent and quiet. In an elderly person, it is a wise precaution to give only half the dose intravenously for a prompt effect and a few minutes later give the rest subcutaneously, a preparation containing adrenal being absorbed rather slowly from the subcutaneous tissue. A peculiar phenomenon, seen not infrequently in asthmatic patients, is the great and prompt relief that may follow a dose of adrenalin and be maintained for twenty-four hours or more, and then in the same subject, on another and apparently similar occasion, not only no relief follows, but the condition be made worse.

In a case in which hemorrhage is anticipated, for instance, after a turbinectomy in which subsequent packing is not intended or where a history indicating a tendency to abnormal bleeding has been obtained, a preliminary injection of one of the hemostatic serums will greatly lessen, or perhaps entirely avoid that outcome. The addition of one minim of adrenalin and four or five of pituitrin lessens the likelihood of the anaphylactic symptoms that sometimes follow the use of the serum. If hemorrhage has already begun, the same remedy should be used intravenously. To one who has not used it in this manner, the result is unbelievably swift. The class of patients in whom adenoid and tonsil affections are found contains a large proportion of those in whom the socalled status lymphaticus exists. Under anesthesia, no matter how skillfully induced and in some cases merely from the fright that thought of an impending operation induces, they at times come perilously near sudden death. Such accidents are not uncommon. Lowering the head will sometimes tide over the crisis, but our most potent remedy is an intravenous injection of one or two minims of adrenalin, with four or five minims of pituitrin. The jugular vein is in easy reach, and even in the excitement inseparable from such an emergency could hardly be missed. If circulation has not absolutely ceased this procedure will restore it, and even when it has apparently stopped for half a minute or so, it is stated that such an injection into the heart muscle will again induce contractions. Of this latter I have no personal knowledge.

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The Relation of the Endocrines to Internal Medicine*

By ARTHUR H. HOPKINS, B.S., M.D.,
Philadelphia.

The importance of the part played by the endocrine glands in internal medicine is, I believe, beyond our present realization. From the present literature, which is steadily accumulating along these lines and is revealing much that is new in this field, one's thoughts drift along into the realm of the future where one may see, though dimly as yet, great possibilities. In the consideration of our patients' symptoms, bearing the endocrines in mind, the possibilities again creep up of what might be done for them could we but have a little clearer insight into their meaning. In spite of the progress that has already been made in this field, the subject still remains a complex one, and there is much to be desired from the viewpoint of etiology, diagnosis and therapy. We know many of the etiological factors underlying the dysfunctions of these glands, but further progress must be made in this field before theory can be supplanted by fact. An attempt at a classification of these factors will be given a little later.

DIAGNOSIS.

The question of diagnosis is paramount. A heavy responsibility rests upon the shoulders of the clinician, for it is demanded of him that he not only make the diagnosis, but if he is to fulfill his function as an internist, he must go beyond this and ascertain the disturbance or condition which first called forth an increase or a decrease, or a dysfunction of one or more of the glands involved.

Here the question which confronts us all today is how best this diagnosis may be made. The clear cut cases need no description as they are familiar to us all. It is rather the atypical syndromes, suggestive but vague, which give us the most difficulty in establishing a diagnosis of sufficient accuracy as to form a sound basis for therapy. There are several ways which will be of service in such a diagnosis and these will be mentioned briefly with the hope that they will be of some assistance from the practical viewpoint.

In the first place we must familiarize ourselves thoroughly with the type of questions necessary in history taking, to elicit the points of most importance in establishing factors bearing on glandular disturbances. Many leads may be overlooked entirely by failure first to take and then properly to analyze a fairly comprehensive history. To go into the details of the points to be investigated would be to go beyond the scope of this paper. Suffice it to say that the three chief factors to be borne in mind are: First, heredity; second, body structure of the individual, and third, exciting causes leading to development of definite symptoms.

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In questioning the patient concerning heredity we have to recall that, aside from the presence of anomalous body contour in the antecedents, such diseases as diabetes, goitre, hay fever, asthma, obesity, epilepsy, and periodical headaches are all to be considered. Next the general body structure of the individual has to be studied and such factors as the length of bones, condition of muscular tissues, distribution of hair, the skin, teeth spacing, etc., are all to be borne in mind.

ETIOLOGY.

Finally, as mentioned above, the discovery of the exciting cause leading to the development of symptoms indicative of the endocrinal disturbance may be of as much importance as is the recognition of the disturbance itself, and the mere administration of organ extracts to meet the apparent demands of the organism, without eliciting the underlying cause, is unsound therapy. Palliative treatment this is, and quite valuable in a tentative way, but not sound, if the condition is not traced to its basal cause.

The exciting etiological factors which seem to be most prominent, after having laid due stress on heredity and developmental defects, are as follows: Trauma, tumor, physiological epochs of life, infectious diseases, focal infections, toxemias, diet (proteid, fat and carbohydrate, idiosyncrasies, starvation), emotions, as mental strain and worry, fatigue and chilling.

Taking these up individually, little attention need be paid to the influence of tumor formation on the pituitary, thyroid, and other glands as these conditions are selfevident even to the inexperienced.

Under physiological epochs of life, the gynecologist as well as the internist must be more and more impressed with the possibilities offered by organotherapy for the relief of many formerly intractable conditions. These epochs, especially puberty, menstruation, and the menopause, are productive of many and varied disorders, owing to the disturbed equilibrium in the balance of the endocrine glands occurring at these times. The response of the premenstrual pituitary migraine to proper organotherapy and of the nausea of pregnancy to corpus luteum are sufficiently striking evidence of cause and effect in this group.

Infectious diseases have long maintained a prominent place as causative factors of disturbed endocrine function, histological changes being found in the glands of individuals who have succumbed to the infections, of which influenza has occupied a prominent place. Hyperplasia of the anterior lobe of the hypophysis has been occasioned experimentally by innoculation of rabbits with typhoid bacilli. As Cushing (1) suggests, the pituitary normally reacts to bacterial intoxications, and further, animals subjected to a partial hypophysectomy are exceedingly unresistant to infections. He maintains that the intact gland probably evolves some antagonistic substance and in so doing there is produced a functional hyperplasia. The relation of infections to the other glands is merely mentioned here in passing, as the facts are too well established to call for further comment.

FOCAL INFECTIONS

In focal infections we may have an equally potent source of disturbance of these socalled defense glands, more insidious, however, than in the case of the acute infections, probably because the introduction of toxins into the body is less rapid and less overwhelming, and we may be justified in assuming that the defense of the glands in these instances is more gradual, just as it may be less urgent. If the condition is permitted to continue its effects will probably make themselves manifest in due time.

TOXEMIAS.

With regard to toxemias and their effect upon these glands, one finds no dearth of evidence in the literature. Indeed, the relation of the gastrointestinal tract to the endocrines may be of more importance than we have been inclined to attribute to it. Lane's report of atrophy of the thyroid due to faulty intestinal absorption is only one of many instances in point. From the verbal report of a neurological colleague and from my own results in the past year I am convinced that faulty intestinal digestion and inadequate elimination, when sought for and corrected, offer results both gratifying and significant.

DIET.

Diet is another causative factor which is of considerable value from the viewpoint of therapy. The ingestion of large amounts of carbohydrates causes an increase at times in the hypophysis. Given glands which are unstable as the result of heredity or of some other influence, it does not seem to be assuming too much to say that a concentrated carbohydrate diet may readily disturb the balance of the pancreas, the pituitary, and as a consequence, the thyroid, in the course of metabolism. From the experimental side of the picture, one cannot read the works of McCarrison (2) without being tremendously impressed with the glandular changes that are produced in animals, as a result of starvation and of continued withdrawals or introductions of the various foods, not in their normal proportions. An interesting and suggestive feature that this author emphasizes is the fact that during these studies, alterations in the structure of the glands preceded, for long periods, any symptomatology. Hypertrophy of the adrenals due to deficiency of fat, atrophy of the thyroid from inanition, and hypertrophy of the thyroid with forced feeding of fats, and finally the dependence of adrenal function upon the proper balance of foods, are a few of the many convincing facts pointing to the importance of investigation into, and the correction of, faulty diet as an underlying cause of unbalance of the ductless glands.

Emotions have long been recognized as potent factors in upsetting the normal balance of the endocrines and of ushering in changes, which, in time, produce definite disease, as in the case of exophthalmic goitre. Could a better illustration of this be offered than the report of Richards and Etienne (3) who cited cases of exophthalmic goitre, with high blood pressure, developing within a period of twenty-four hours as a result of terror due to bombarding of Paris by airplanes in the course of the world war. Such instances are striking and convincing for the group in which sudden and great fright produces equally sudden and great changes in the thyroid gland. More insidious, however, and more cryptogenic because of this fact, are the great number of emotional causes in our daily life which exert their action more gradually and over a longer period of time and which are consequently more readily overlooked.

The causes of diabetes as given in textbooks, include worry and anxiety. According to Cobb (4), "this assumes that mental causes may upset a bodily function or functions and thereby disorganize metabolism. Prolonged anxiety, business worry, or a sudden shock are said to produce diabetes, just as does puncture of the floor of the fourth ventricle. It would seem equally possible that the same causes can and do upset the mechanism which governs the balance between the ductless glands."

Finally fatigue, resulting from overwork, and especially mental overwork, while regarded as a symptom in some of the endocrinal syndromes, would seem to be well placed with the group of etiological factors given above.

The discussion of the etiology of disturbances in the ductless glands has been given at some length, but the importance of a knowledge of, and a careful search for, the cause in all of these cases may be as important to the patient and the clinician as is the judicious use of organotherapy.

To turn now to some of the endocrinal disturbances that are encountered in internal medicine, I wish briefly to refer to a few which recent investigations have revealed. I shall not consider exophthalmic goitre, acromegaly, hypopitutiarism, Addison's disease, and others concerning which our impressions are comparatively well fixed, but shall discuss some of the more atypical and as yet less well defined conditions.

In this latter group may be mentioned certain types of obesity, neurasthenia, epilepsy, pituitary migraine, and certain menopausal conditions. In a former article (5) I have described one phase of the menopause as influenced by the endocrine, and in another article soon to be published, the pituitary migraine is described in connection with the presentation of a series of cases.

OBESITY.

In considering obesity an hereditary tendency is common and dietary factors are obviously important. However, "the endocrine glands stand in the first rank as directive agents of the phenomena involved in the development of this condition." Peterson and Walter (6) in a study of twelve hundred subjects, in which twenty-five hundred basal metabolism observations were made, confirm the view that basal metabolism tests are necessary for diagnosis and therapy, but they also state that the mass of evidence is against weight being influenced to any consistent degree by thyroid activity alone, as evidenced by this test. In their series they had thirty-two cases of high metabolism and low weight, nineteen of which were exophthalmic goitre. On the other hand, they had twenty-two subjects showing high metabolism and overweight, and in general with the overweight there was an excess of blood sugar.

From this great mass of material, to which due consideration must be given, these authors offer some suggestions of real value. Of these, one is the forceful recommendation of the portable (Benedict) apparatus for making the metabolic tests, as they consider it more reliable, in that it may be carried to the bedside and the studies thus can be made without undue nervous excitement and with the patient free of the effect of physical exertion and, also, free from food influence as the studies can be taken in the morning before breakfast. This is of great importance in obtaining trustworthy results. Another point of considerable interest is the fact that the pulse rate is a fairly constant, though not infallible, guide to the metabolic rate, a pulse rate of over 90 being usually associated with an increased metabolic rate.

With regard to the study of blood sugar in these cases, it is regrettable that a method as simple as Bang's should have been largely discarded, for it is obvious that with our present methods for estimating the sugar tolerance, where two or three c. c. of blood are required, as against two or three drops in the former method, the nervous patient is certain to be influenced by the continued insertion of a needle into a vein at frequent intervals over a two or three hour period. This is a factor not lightly to be reckoned with, for the results are unquestionably rendered less reliable, though the technic is accepted as more accurate.

NEURASTHENIA.

This we formerly regarded as "a maladjustment, a defense reaction against one's environment" as it were, and let it go at that. We have come to realize, however, that many facts concerning these patients repeat themselves in a majority of cases. Heredity may or may not be suggestive. Changes occurring during the developmental period in many instances point to unnatural endocrinal influence and finally, the symptoms which develop following an acute infection or some other equally potent exciting cause, such as nerve strain or worry, and earn for themselves the title of neurasthenic, present, in reality, a typical picture of adrenal insufficiency. Cannot this explain the fatigability, loss of weight and strength, persistent nervousness, apprehension and introspection, the general relaxation of smooth musculature with its accompanying visceroptosis, constipation and often flatfoot, low blood pressure and cold extremities? A lymphocytosis completes this picture of a vegetative nervous system lacking in tone. The part played by the pituitary in this picture is to be conjured with. In other words, given a preformed endocrine instability and add to this a sufficiently powerful exciting cause and we have as a result, a more satisfying as well as a more scientific name for this socalled neurasthenia, which has been the *bête noire* of many generations, but which need no longer remain so, if appropriate treatment is instituted.

EPILEPSY.

Some of these cases fall within the realm of endocrinology, and here again our criteria lie in the hereditary history, the developmental years and the present examination. There are two groups, the first or "distinctly pituitaric type being represented by the adipose, sluggish individual with smooth skin, small genitals, a high sugar tolerance and a small closed in sella turcica. Improvement or even cure may be accomplished by proper administration of pituitary extract. The fit is produced as a symptom, a periodical enlargement of the hypophysis in a sella not roomy enough to accommodate it, causes the explosion" (7).

In the second group we again have heredity and early life factors to consider, and here the condition is regarded as due to retained nitrogenous products, probably split protein and aminoacids. "The retention in the cells of these partial decomposition products acts as an irritant which finally produces the epileptic seizure as a purposeful act, for the convulsion, accompanied by its profuse sweating, increased kidney function and bowel action, tends to relieve this condition."

Kendall explains the retention of aminoacids in the cell by noting that the thyroid gland, through its iodothyroid product, converts the aminoacids into ammonium carbonate, carbon dioxide and water, the ammonium carbonate being probably changed by parathyroid activity into urea.

Thus, if the thyroid parathyroid mechanism is dysfunctioning, these end products of protein metabolism or toxines fail to be adequately eliminated and it may be due to this failure of elimination that the epileptic seizure is provoked, in those patients who have an already unstable glandular activity. Disturbances in the pituitary, ovary or suprarenals, which call forth more than the usual thyroid parathyroid secretion, may thus be underlying causative factors, and the many provocative etiological factors noted in the first part of this paper should be given due consideration in the study of such conditions.

ORGANOTHERAPY.

Many questions referable to organotherapy remain to be answered. I wish to call attention to a few of the more important points.

1. As these extracts are not available from the human being, they are introduced into the body as foreign proteins and must be regarded as such.

2. The chemical action of many of the preparations is undetermined.

3. Some of the reasons for variability of action of organ extracts are as follows: A. The fresh gland deteriorates rapidly at any temperature above freezing and for this reason the best preparations are those which have been completely desiccated within twenty-four hours at low temperature. B. The defatting process is carried out with varying technic and solvents, and by some manufacturers it is not even attempted. C. Owing to the influence of handling and of deterioration, the extracts are probably better administered in capsule rather than in tablet form.

4. As Strauss (8) has noted, there are only three preparations of the specific glands which are standardized; these are the posterior lobe of the pituitary, the thyroid, and the extract of the medulla of the adrenal glands. Even the standardized posterior lobe of the pituitary varies greatly. This comes from the steer, i. e., the adult male and the castration causes many functional and structural changes in the animal, for the most part due to alteration of the pituitary gland secretion.

5. Other gland material varies with different manufacturers, and it is reasonable to assume that some variability of action may naturally occur when different species are used. Thus the thymus comes from the suckling calves or sheep, orchitic substance from bulls or rams, ovarian preparations from the cow or sow, the corpus luteum from the ovary of the pregnant cow, and finally, adrenal gland extracts from male or female, there being no stipulation by the manufacturer as to which sex has been utilized. It would seem that physiological effects might be markedly influenced by variation in sex as well as in species.

The question arises, how may we best overcome these numerous obstacles, and the answer will be somewhat as follows:

1. To stabilize therapeutic results the manufacturers will have to carry out a uniform technic with glands from an accepted series of animals.

2. Standardization will have to be advanced into broader fields.

3. The physician will not only have to abandon the old fashioned methods of administration, but if he is to derive satisfaction in this newer field of therapy, he will have to keep abreast of the times by keeping himself posted on the advances in endocrinology.

4. Careful clinical records of the action of the extracts, it is to be hoped, will accumulate in the coming years and will thus give us a better therapeutic working basis than we have at present.

5. In the use of these substances, the weakest link in the endocrine chain must be recognized, and therapy aimed directly at it, with reinforcements added as indicated.

In conclusion, it might be well to recall that an individual's endocrine tonus may at times determine to quite an extent both his physical and psychic life, that organotherapy offers great promise in the proper balance of this tonus, that the use of the individual extract in moderate doses, as indicated, is far safer than the combined extracts as put out by certain manufacturers, and finally that these socalled polyglandular preparations are untrustworthy and unscientific.

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1726 PINE STREET.

Editorial Articles

THE PROGNOSIS OF CYSTS OF THE THYROID GLAND

Generally speaking, cysts of the thyroid have a benign prognosis when their size is not excessive. There are certain cysts that may give rise to trouble. If the lesion is left alone it may go on increasing indefinitely merely causing some difficulty in movements of the neck, but such is not always the case and complications may arise which greatly aggravate an otherwise good prognosis. The possibility of compression of the respiratory tract, the large vessels and nerves of the neck, constitutes the principal danger of these cysts. The phenomena of compression are frequent and are the consequence of a rapid growth of the tumor due to various influences. Following a violent or spontaneous effort hemorrhage may take place into the cystic cavity with the result that the subject is seized by paroxysms of suffocation that may result in death. An inflammatory process may develop in the cyst and from there invade the entire gland, resulting in paroxysmal attacks of dyspnea which, if in too rapid succession, will end in suffocation.

When the cyst is voluminous it may rupture, its cavity becomes infected and prolonged abundant suppuration menaces the patient's life, while operation in these circumstances is naturally dangerous. Should the abscess rupture into the trachea suffocation is likely, while if this should take place into the pharynx the pus swelling above the epiglottis will flow into the larynx and stifle the patient.

Edema of the glottis is another formidable complication of these cysts. The inflammation may extend to the loose cellular tissue surrounding the trachea resulting in a phlegmon of the neck extending into the mediastinum and axillæ.

Besides these acute complications the tumor may jeopardize the patient's life by compression of the respiratory tract. Usually the cyst is small, hidden behind the sternum during inspiration, but although it may appear to be small it sends off prolongations which compress important organs. The trachea is pushed aside and flattened, sometimes softened; the large veins of the base of the neck are compressed, likewise the origins of the brachial plexus and it is then that there develops venous stasis of the face, neck and upper limb with radiating pain similar to that experienced in angina pectoris. Attacks of dyspnea recur at short intervals, and death results.

All these complications occur rather late in the evolution of the cyst and may never take place even if the cyst becomes very large; nevertheless, an operation should be undertaken at as early a date as possible in order to relieve the patient from any possible complication. Excision of the cystic thyroid when resorted to before any untoward effects of the lesion have been allowed to develop should, with our modern procedures, offer a mortality of *nil*. When any of the complications referred to, especially suppuration of the cyst, have developed, the operative mortality naturally becomes increasingly high.

THE OPTIC NERVE IN EXOPHTHALMIC GOITRE

In Graves's disease the perturbations involving the optic nerve can be divided into two phases occurring in the evolution of the affection. In the first the disturbances are purely functional; in the second the cause persists or becomes accentuated and nutritive disturbances arise with all their consequences, although this outcome is uncommon.

The first effect of exophthalmos is to render the optic nerve tense by strengthening it. The first effect of this traction is borne by the fibrous sheath of the nerve and as it is resistant, the elongation is slow in taking place. Hence the optic nerve does not as yet suffer, while the ciliary nerves which lack protection of this kind, are in this phase more or less tense. But at length the sheath becomes so elongated that the nerve will be directly submitted to the effects of traction. Hence the development of special disturbances whose evolution will follow the oscillations of the exophthalmos.

It is difficult to estimate the degree of elongation which is necessary for the production of functional disturbances of the eye. Marked exophthalmos may not determine any disturbance of the optic nerve while less pronounced cases rapidly cause a loss of visual acuity. When the exophthalmos has given rise to lesions of the nerve they increase or diminish with the cause unless the nerve has undergone structural changes. In certain cases these lesions persist as purely functional disturbances for a long time and visual acuity becomes normal as the exophthalmos diminishes.

In the first place the disturbances are purely functional. Symptoms of irritation of the optic nerve are first to occur—hyperesthesia of the retina, photophobia, and others. Then to this phase of excitation succeeds a phase of depression in which all the symptoms of paresis met with at the onset of progressive optic nerve atrophy will be noted. But the amblyopia rather constantly presents certain peculiarities of importance, in that they allow one to distinguish it from that due to optic nerve atrophy.

The characters offered by the visual field suffice to differentiate unquestionably goitrous amblyopia from the hysterical form and from progressive atrophy of the optic nerve in which the visual field is always changed. If the exophthalmos is accentuated the phenomena of the second phase develop. One of two conditions will be met with. Either the tension of the nerve will result in a true neuritis whose traces will remain for a long time, or else the trophic system of the optic nerve will be involved and a veritable atrophy ensue, which will be readily detected by the ophthalmoscope.

But in exophthalmic goitre these lesions of the optic nerve hardly ever attain an extreme degree. Sight never falls below one tenth. That blindness does not occur is probably due to the fact that the exophthalmos, even in the most pronounced cases, never extends beyond a certain limit and that generally it does not remain long enough in a pronounced degree for structural lesions of the optic nerve to become generalized.

PRESENT DAY ORGANOTHERAPY

At a recent meeting of the British Royal Society of Medicine, Dr. Swale Vincent, of the Middlesex Hospital Medical School, delivered a paper on the Present State of Organotherapy which has been provocative of a great deal of interest. Doctor Vincent opened his discussion by saying: "It has been maintained that, in therapeutics as in other matters, only those methods which are found to be useful and beneficial will ultimately survive. In the ordinary practical affairs of life, this anticipation may be well founded, but in such matters as the employment of various substances to relieve pain, or to restore to normal the deranged machinery of life, it would seem that we cannot even yet trust, either the scientific discrimination of medical men or the common sense of the general public, to eliminate the useless and to hold fast to that which is good." The paper goes on to reveal the grounds for Doctor Vincent's suspicions.

The belief in the efficacy of all the substances involved in the practice of organotherapy is based upon, in Doctor Vincent's opinion, a widely current view in regard to the internal secretions, namely, that all organs and tissues in the body manufacture and pour into the circulation substances whose function it is to regulate the activities of different parts of the nervous system, and so to influence the general metabolic activities of the animal economy; and that any lack or deficiency of these may be supplied by administering preparations containing them. This has led to, among other things, the "untenable hypothesis" of the relation of the secretion of the chromaphil tissues to the circulatory system, and the whole "fabric" of vagotonia and sympathicotonia, so dear to credulous physicians," and has given name to "nonexistent hormones." When physiological experiments failed to demonstrate that all parts of the body furnish internal secretions, and that the organism is likely to suffer a deficiency of any one or of several of these secretions, "a large number of physicians insisted on the value of organic extracts, urging that, though they may contain no physiologically active principles, they are found empirically to do much good in various diseases and disorders." Doctor Vincent believes that in the majority of cases in which this has seemed to be adduced, it was possible at a later period to correlate the observed therapeutic value with a definite pharmacodynamical action.

The next point made is that such substances administered by the mouth have no physiological effects, and when administered subcutaneously or intravenously have only slight temporary influences. In a few cases, growth of young animals has seemed to be affected, but the therapeutic value of these findings is practically negligible. The one and only way to demonstrate the value of a treatment is through a series of careful and accurate experiments, regulated by a system of adequate and rigid controls. Reports of cures of single, separate cases mean practically nothing.

Discussion follows of these findings as applied to thyroid and parathyroid, pituitary, adrenal, testicular and ovarian, and pancreatic medication. The methods of Steinach and Voronoff are commented upon, but, because of their very recent character, no positive opinions are expressed. About the new pancreatic preparations for diabetes, Doctor Vincent says: "It will be wise not to be too sanguine in regard to these . . . but it seems probable that a step in advance has been made, and it is not out of the question that, sooner or later, we may have at our service a preparation made from the pancreas which will benefit diabetic patients in a degree comparable with that of the thyroid extract in myxedema."

Doctor Vincent summarizes his conclusions as follows: "If we seek for cases where it is possible to apply a true substitution therapy—artificially to replace the internal secretions of a gland—we have no clear instance except the solitary one of the thyroid. It may be that we shall before long be able to include the pancreas in this category. There are, however, some few instances where extracts of organs are valuable as drugs, apart altogether from the question of internal secretion. Such are adrenin (given subcutaneously or intravenously) and extracts from the posterior lobe of the pituitary body. Of the rest of the gland and tissue extracts and preparations, it might perhaps be well to say nothing, if it were not that their exploitation on the present day scale constitutes a formidable kind of quackery. There is no subject upon which so much utter nonsense has been talked as upon internal secretions. And organotherapy, for the most part, may be defined as the application of this nonsense to practical medicine."

DEFICIENCY DISEASES

What is the definition, exactly, of a deficiency disease? One does not know exactly what is meant by a deficiency disease. Not long ago the statement was widely prevalent, that a deficiency disease was one in which one or other of the vitamines was absent or impaired and it seemed to be generally understood that vitamine deficiency was the sign manual of a deficiency disease. At the present time no great consideration is shown for the vitamines. It is not that the presence of the vitamine element in a diet is not still recognized as essential to good health, but it has been shown that other constituents are quite as important in a diet as vitamines. The mineral salts and especially the calcium salts, for instance.

It is not so much the lack of a single constituent that impairs health but the error in dieting properly more often lies in want of metabolic equilibrium. In the case of infants and young children both quality and quantity of food are at fault. Infants are often stuffed rather than fed and, of course, when they are stuffed with unsuitable food the results are the worst. But even when feeding with an appropriate diet, a great deal of harm can be done to an infant by cramming it with food. The same remark applies with equal force to the adult. Many men and perhaps more women dig their graves with their teeth. In civilized countries, at least in civilized English speaking countries, more women overeat because, as a rule, they do not take so much exercise as men and consequently their food is not assimilated and digested so thoroughly. In cities, in particular, one of the evils of modern life and perhaps the one most injuriously prejudical to health is eating and drinking more than the human machine requires to maintain it in a highly efficient working order.

It needs but little knowledge to assert that diet is an important factor in preventive medicine. And it can be stated further that if the diet of all was based on scientific principles and particularly the diet of the poorer classes that general health would improve beyond belief. The drawback to our chances of reaching this ideal is that as yet there is no standard by means of which scientific principles of diet can be gauged or approximately gauged. Not long ago a meeting of the Society of English Medical Officers of Health was held in London at which a paper was read by Prof. G. Mellanby, whose work in connection with the causation of rickets is well known in this country. Prof. Mellanby is a confirmed believer in diet as the chief factor in causing rickets, although he may lay too great stress on the influence of the fat soluble vitamine in preventing this condition.

However, little criticism can be rightly directed against his dictum, that persons' tastes are not always a reliable guide as to the best food. For instance, the starchy foods and sugars which children desire are not the foods they most need. Again, in the diet of adults and especially of those of manual workers of the English speaking race, cereals and butchers' meat, which usually take a great place, are supplemented by potatoes, pulses, lard, vegetable margarine, jam, coffee, cocoa and tea while milk, cheese, eggs and green vegetables are neglected. Thus the diet is deficient in vitamines, in the mineral salts, and of calcium salts in particular. In conclusion Prof. Mellanby made the following suggestions.

The consumption of codliver oil should be greatly increased. It is the cheapest source of the vitamine on the market. More milk ought to be consumed. The eating of green vegetables especially raw salads, should be encouraged. Prof. Mellanby would like to see calcium carbonate added to butter and adult diet should be regulated so as to contain more fat soluble vitamine.

It is likely that the value of the vitamines has been somewhat too greatly emphasized. All appear to agree that the diet of the working classes is deficient in fresh food and no doubt the cooking of food does to some extent tend to diminish its nutritive value. Too much cooking does this.

Dr. Harry Campbell, of London, one of the most original thinkers of the day, holds the opinion, and is not chary of expressing it, that when one has one's teeth milk is not needed, and that the consumption of milk and the eating of predigested foods and too much starch and sugar, so common a practice nowadays, are responsible for bad teeth and bad digestion. Dr. Campbell argues that teeth and jaws are constructed in such a manner, and the digestive organs and general plan of the bodily makeup of man is such, that he is intended assuredly to masticate vigorously hard food and not the soft prepared food with which he is wont to overload his stomach, a habit which is prone to induce that frequent condition of modern civilization, intestinal stasis.

The disorders of digestion deserve more close and patient study than any other disorder to which man is prone, for the reason that these are the origin of most of human diseases and conditions of ill health. So far as treatment is concerned, as is pointed out in *Medical Press and Circular*, for February 7, 1923, the fact has not yet been grasped that nineteen twentieths of the treatment of digestive disorders is prophylactic, and consists in due attention to diet. In many respects views as to diet require further study and a considerable amount of revision.

DUPING THE PUBLIC

The series of articles by "Dr." Paul de Kruif running in *Hearst's International Magazine*, and attacking in a most insulting manner the medical profession and its practices, is written in a spirit of such spiteful animosity, such apparently willful ignoring of actual facts, that it is clearly evident that the writer's attitude of mind must arise either from some childish personal bias or grudge, or from a desire for cheap notoriety through rushing into print about things, about which he is totally ignorant, to a reading public notably deficient in educated intelligence, and gullible enough to swallow any kind of bunk. From the point of view of the physician, such articles are only to be ignored, or, at most, to be passed over with a laugh, but there is another and more serious aspect to the problem—that of the popular mind, which will accept the untruths and inconsistencies, and undoubtedly be influenced by them, unless they are publicly contradicted and disproved. Picture the farreaching, detrimental effects upon the unthinking, gullible readers of sensational literature of the following: "If the profession does not wash its own dirty linen, the disagreeable duty will have to be done by others. That is the principal purpose of this series. If doctors insist on being fooled, some power will have to arise that will make it harder for them to be fooled. If they continue to follow the siren voices of drug mongers, and use nostrums that may actually endanger lives, some method must be devised to keep such tools out of their hands. The many doctors who treat their patients indiscriminately with these products do so out of ignorance and commercialism. After all, the only value they know to exist for the injection is the five dollars that they will get on the first of the following month."

It is easy to see that it is not the intelligent, well informed people who will be influenced by such statements, but the large class of ignorant readers who will take the articles seriously, accepting these verbigerations as truths, becoming more and more bitter, from lack of understanding or some unfortunate personal experience, against medical treatment, and so cut themselves off from the benefits to be derived from it. The large class of decent and intelligent men and women, however, who are conversant with the standards, aims, and achievements of the recognized medical profession, will never be influenced by literature so evidently published for purposes of propaganda, so full of extravagant and exaggerated statements, and so lacking in a foundation of facts. They will realize that medicine must have its limitations by the very nature of the material with which it deals, but they will also know, through their own intelligence and from personal experiences, the qualifications and ability of the capable physician to minister to the human organism and its afflictions.

COURSE IN NEUROPSYCHIATRY TO BE GIVEN BY VETERANS' BUREAU

A special course in neuropsychiatry is offered by the United States Veterans' Bureau to a certain number of qualified physicians. The bureau's policy is to provide expert medical attention for disabled veterans in order that they may be restored as quickly as possible to health and to a proper place in community life. In carrying out this purpose it was found that the available specialists in nervous and mental diseases were not numerous enough to supply the demand. The course will continue for about four months, and will consist of about 176 lectures and 440 hours of clinical and laboratory work. Special attention will be given to diagnosis, general care, and methods of treatment. The general problems of hospital administration, medicolegal questions, rehabilitation and reeducation, and psychological examinations will also be covered. The main part of the course will be given at St. Elizabeth's Hospital at Washington. Other public hospitals in Washington will provide abundant clinics in functional disease, borderline cases, and the milder types of mental and nervous disturbances. On satisfactory completion of the course, the student will be recommended for the grade of passed assistant surgeon in the Reserve Corps of the U. S. Public Health Service, or will become eligible for employment as Class B physician under the U. S. Civil Service Commission and assignment to duty with the Veterans' Bureau. Application for taking the course must be made to the director of the U. S. Veterans' Bureau. Washington, D. C.

CANCER MORTALITY IN 1921

The Department of Commerce has announced that the returns compiled by the Census Bureau show that more than seventy-six thousand deaths from cancer occurred in the death registration area of the United States during 1921. Assuming that the remainder of the country had as many deaths from this cause in proportion to the population, the total number of deaths from cancer in the entire United States for 1921 was ninety-three thousand. For 1920, the number is estimated as eighty-nine thousand or four thousand less than for 1921, or, in 1921, eighty-six to the one hundred thousand population against 83.4 for 1920. The Bureau has used "adjusted" rates in order to make allowance for differences in the age and sex distribution of the population, because, as a rule, only persons in middle and old age have cancer, so that a State with many old people may be expected to have more deaths from cancer than a State with comparatively few old persons. The highest adjusted cancer rate for 1921 is 99.6 to the one hundred thousand population for Massachusetts, and the lowest is 47.6 for South Carolina. In the case of a few of the States, separate adjusted rates for the white and colored population have been calculated. In this group of States, the highest adjusted cancer rate for the white population is 95.9 to the one hundred thousand for New York, and the highest rate for the colored population is 90.6, also for New York. The lowest adjusted cancer rate for the white population is 51.5 for Tennessee, and the lowest for the colored population is 36.4 for Florida. The adjusted rates show that the Northern States have comparatively high, and the Southern States comparatively low, cancer mortality, and that there is little difference between the adjusted rates of the white and colored races of the same States.

CHILD WELFARE IN ROUMANIA

The American Red Cross, in 1919, first established child welfare stations in Roumania in response to an appeal from the government for their assistance in combating the alarmingly high rate of infant mortality. It was decided, after a conference of the Red Cross and the most important Roumanian welfare organizations, that the most practical form which the projected relief could take would be the establishment of an efficient nursing service on public health lines, particularly in its relation to child welfare. Activities began in 1920, when several British trained nurses were sent to Roumania to take over and expand, for a period of six months, the child welfare work begun by the American Red Cross in the clinics of several cities. By the end of the year, the clinics were progressing favorably, volunteers had been secured and were being trained, and a course of instruction for Roumanian nurses had been arranged and given in the form of weekly lectures. In 1921, it was decided that, on the completion of the six months' work in the clinics, a centre for training young women in the aftercare of maternity cases and in the care of children should be established at Bucharest. The Xenocrat Hospital in this city was taken over, equipped and maintained as a school for training twenty-five pupils from all parts of the country in practical methods of child welfare. Later in the same year, a training school for midwives in child welfare was also opened at the Xenocrat Hospital. The work progressed so rapidly and so favorably that during 1922 twenty-five dispensaries for babies were opened in the provinces, a travelling dispensary was established, and two mobile units for giving lectures and demonstrations.

NEW MENTAL HYGIENE BULLETIN

A new publication treating of current events in the field of mental hygiene is being issued, beginning with the January number, by the National Committee for Mental Hygiene. The title is *Mental Hygiene Bulletin*, and it will be published every month except July. The announcement states that the section in the official organ of the committee, *Mental Hygiene,* devoted to items of news and entitled Notes and Comments, has of late needed so much space that the editors have found it impossible to make room, even for the major items. It was evident, therefore, that there was need of a more frequent publication to disseminate information to those interested in current events. For this purpose the *Mental Hygiene Bulletin* will be issued and will record events whose importance lies not so much in their permanence as in their timeliness. Dr. Frankwood E. Williams, director of the National Committee for Mental Hygiene and editor of *Mental Hygiene,* is editor of the *Bulletin.*

ENDOCRINE LITERATURE

In the manner of the NEW YORK MEDICAL JOURNAL AND MEDICAL RECORD the *Prescriber* (Edinburgh, October, 1922) has assembled an extremely interesting group of papers on the topics of thyroid and parathyroids in a special endocrine number. Stanley Jones writes on the thyroid in acute infections, H. Ewan Waller on Graves's disease, Ivo Geikie Cobb on thyroid therapy, Philip A. Harry on the thyroid in eye disease, Thomas Stephenson on thyroxin, and H. W. C. Vines has a paper on the parathyroids. There is a goodly review of the literature. All in all it is a well assembled number and shows an effort on the part of the editor to serve the readers of the *Prescriber* with material of a stimulating and valuable character.

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News Items.

Antivivisection Bills Killed.—The Assembly Codes Committee voted unanimously to kill the Cotillo-Leininger Antivivisection bills. One was designed to prevent "experimentation" on children, and the other would have prevented surgeons from making experiments on living dogs. Assemblyman Duke, chairman of the committee, declared the real purpose of the child bill was "to advance Christian Science" by preventing medical treatment for children unless their parents consented. The penal law now forces parents to provide medical treatment for their children.

Encephalitis Lethargica.—According to reports made to the Division of Communicable Diseases of the New York State Department of Health, 308 cases of encephalitis lethargica occurred in New York State during February of this year, which is more than in any other month during the last two years. With the exception of February, 1921, the month of February this year also shows the highest record for cases of this disease in upstate New York.

American Medical Association Tour.—The train for the special twenty-five day tour from New York City to the meeting of the American Medical Association in San Francisco, organized under the auspices of the Medical Society of the State of New York, is already filled. Another train will be arranged for if 125 more subscribers can be secured. In order to do this, however, it will be necessary for applications to be in not later than April 15th. Applications should be sent direct to Mr. J. S. McAndrew, tour manager, Lifsey Tours, Inc., 1472 Broadway, New York.

$1,500,000 School for Mt. Sinai Nurses.—Plans have been made for a $1,500,000 training school for nurses at Mt. Sinai Hospital, it was announced by Leo Arnstein, acting president, at the annual meeting in Blumenthal's Auditorium, 1 East Ninety-ninth Street. The new structure will be the eighteenth building maintained and supervised by the institution. Half the cost has been promised by the trustees. The school will accommodate 400 nurses, as against only 220 who are housed in the present building on Madison Avenue. It will be built on a plot 100 by 125 feet. Mrs. Otto H. Kahn gave the hospital an adjoining lot on Ninety-ninth Street near Fifth Avenue to form part of the plot.

Jewish Hospital Will Be Enlarged.—More than a thousand persons participated in the laying of the cornerstone of the new $500,000 wing of the Jewish Hospital in Brooklyn, known as the Abraham Abraham Memorial. The construction of the new wing was made possible by the initial gifts of the widow of Abraham Abraham, a merchant and philanthropist, who was the first president of the institution. During the ceremonies officials of the Jewish Hospital announced the completion of plans for the construction of another wing to the building and the donation of $75,000 needed for the work. It was announced that the hospital had taken title to sixteen lots adjoining the site of the new memorial.

Pasteur Performance Given for Academy of Medicine Fund.—Members of the Academy of Medicine and their friends attended a benefit performance of *Pasteur*, given by Henry Miller and his company at the Empire Theatre. Mr. Miller gave the performance to aid the fund that has been started by the Academy to raise $250,000 to carry out an arrangement with the Rockefeller Foundation and the Carnegie Corporation for the building and equipment of a new building at Park Avenue and Sixtieth Street.

Mr. Miller and Dr. Edward L. Keyes, Jr., made short addresses after the second act. Dr. Keyes read a message of regret from Ambassador Jusserand, who said that he had not sufficiently recovered from a recent illness to attend. Some $50,000 has already been pledged, Dr. Keyes told the audience.

Western Electrotherapeutic Association Meeting.—The Western Electrotherapeutic Association's fifth annual meeting will be held in Kansas City, Mo., on Thursday and Friday, April 19 and 20, 1923.

Bronchoscopic Society.—The annual meeting of the Bronchoscopic Society will take place in Atlantic City at the Ambassador Hotel, Wednesday, May 9th at 9 a. m., on the day preceding the meeting of the American Laryngological, Rhinological and Otological Society.

Lenox Hill Hospital Meeting.—The Clinical Society of the Lenox Hill Hospital held a special meeting on Friday, March 23, 1923, at 8.30 p. m. sharp. By invitation Professor Dr. Oskar Frankl, of the University of Vienna, addressed the meeting in English. His subject was The Relationship Between Gastrointestinal Carcinoma and the Female Sexual Organs.

Eastern Medical Society.—The Eastern Medical Society announces a dinner and dance for their Loan and Relief Fund which will take place on Sunday evening, May 6, 1923, at the Hotel Astor (Grand Ball Room). This affair promises to be the most brilliant medical social gathering of the year. The charge will be $5 a person. No reservations accepted unless accompanied by check. Remittance may be made to Abraham Strachstein, secretary-treasurer, 17 East Thirty-eighth Street.

New York Electrotherapeutic Society Election.—At the recent annual meeting of the New York Electrotherapeutic Society held on February 27, 1923, at the New York Academy of Medicine, the following officers were reelected: President, Dr. Victor C. Pedersen; vice-presidents, Dr. Harry E. Stewart and Dr. Sinclair Tousey; treasurer, Dr. J. Willard Travell; secretary, Dr. Richard Kovacs; members of the executive committee, Dr. Frederick DeKraft, Dr. A. Bern Hirsh, and Dr. William Benham Snow.

American Proctologic Society.—The preliminary program of the twenty-fourth annual meeting of the American Proctologic Society at Los Angeles, Cal., on June 22 and 23, 1922, has been published. The profession is cordially invited to attend the public sessions, which will be held at the Hotel Alexandria and the Los Angeles County Hospital. In addition to the regular papers, at convenient times during the scientific and clinical sessions, there will be demonstration of instruments and operative technic and discussion of several important proctological subjects as requested by certain Fellows.

Women's Medical Society Convention.—The Women's Medical Society of New York State will hold its eighteenth annual convention in the McAlpin Hotel, New York City, on May 21st.

Many of the doctors will remain for the Scientific Session of the State Medical Society. The scientific session will be composed of a symposium on Eye Diseases in Relation to General Medicine, Feeble Mindedness in Relation to Prostitution, Early Symptoms of Carcinoma of the Cervix, Observations Concerning Gastric Disturbances, and others to be announced later. Arrangements for the convention are in the hands of Dr. Ethel Doty Brown. Reservations for the dinner must be made before Saturday, May 19th. Check for $4 should be sent to Dr. Ethel D. Brown, 26 Gramercy Park, New York.

LONDON LETTER.

(*From our own correspondent*)

LONDON, *March* 6, 1923

DRUG ADDICTION.

Drug addiction in this country is very considerably on the increase. The daily journals are full of its effects and of accounts of prosecutions to do away with the illegitimate sale of cocaine, opium derivatives, and so on. To obtain certain habit forming drugs subterfuges of every kind are resorted to and the police are on the lookout constantly to defeat the ingenious tricks by which the ends of justice in this respect are frequently evaded. At the present time cocaine appears to be the drug of choice here. There is a good deal of talk concerning the horrors of barbarism and the civilized man, presumably Christian, at least, more or less so, is often given to deploring the vices of the poor benighted savage. When, however, all the circumstances are taken into consideration, the bad habits of primitive people are no worse, if so bad, as those of civilized communities. The horrors of barbarism in many respects shrink into insignificance in comparison with the horrors of civilization. In fact, while some of the increase of the drug habit may be attributed to the aftereffects of the war it is more likely to be due to socalled advanced civilization. Progress of civilization is accompanied by progress in vice or vicious habits and *pari passu* with great discoveries, the advance of science, the arts, and above all the art or knack of making money, came luxury and artificial bad habits of every description. The reading of history shows plainly that this statement is true. All nations of the past which have risen to great heights of civilization have become rotten through luxury and have excelled as greatly in moral and social evils as in culture. Ultracivilization has produced ultravices. Witness Egypt, Babylon, Greece and Rome, and especially Greece.

At the present time in this country, and in London, in particular, a loud outcry is being raised against the indiscriminate use of powerful narcotics. Mental balance in these exciting stirring times is not what it was in quieter periods. The manner of life generally predisposes those of imperfect mental balance, and there are many such, to seek new forms of excitement, or rather perhaps to gain temporary forgetfulness, and the attempt is made to achieve this object by means of drugs. Strong drink nowadays is regarded by these ultracivilized to be too gross a mode for finding brief oblivion and the weak and the viciously inclined fly to the murderous narcotics, such as cocaine, morphine and opium.

BIRTH CONTROL.

This is another question which is greatly exercising the minds of the public at large and of the members of the medical profession in particular. It is a matter which closely concerns all and the medical man from more than one point of view. Perhaps it is essentially an economic question. This country is greatly overpopulated. More than two thirds of its population live in cities or towns. It cannot, or at any rate, does not nearly feed its inhabitants. The greater part of its food is imported and agriculture is so handicapped that unless drastic steps are taken to assist the home farmer, conditions will become such that more food will have to be imported. It is being asked on all sides, What is the remedy for this overpopulation? Emigration is that which most forcibly suggests itself. But the arguments against emigration on a wide scale are strong and very much to the point. Neither America nor our own Dominions will accept any but the best stock and this is the stock we can least spare. It would be disastrous if this land were denuded of its hardiest and most energetic members. Therefore emigration will not solve the problem but will rather accentuate the difficulties. The most sinister feature of the situation is that the worst class of town dwellers are increasing out of all proportion. Those who have the largest families are the least able to rear and educate them and instead of being a benefit to the country they are too frequently a source of danger. On the other hand, those who are best equipped mentally and physically to breed and bring up children who will be a true asset to the nation have the smallest families. Many of them, perhaps most of them, have the smallest number of children because they voluntarily restrict the number. It is argued that it is folly to bring children into the world who will have little chance of prospering and that it is wiser to have one or two who may have the opportunity of living decently and comfortably, than several who in an already greatly overpopulated country, will be denied this opportunity.

To be really effective the poor should know how to bring about birth control. Many well known British physicians and surgeons are in favor of knowledge of this nature being disseminated among all classes of society and especially among the poorer classes, where big families are often not only a burden, as emphasized previously, to those who have them, but a danger to the community at large. It is significant that the subject is now openly discussed and that prominent men of every profession and of the medical profession in particular avow themselves supporters of the movement. In any event, it certainly is to the benefit of all that the question should be considered and discussed from every possible angle. Population is increasing in Europe to such an extent, and the opportunities for gaining a livelihood are proportionately decreasing, owing largely to the effects of the war, that unless feasible and reasonable means are found to relieve the situation, disaster must ensue.

REVIEW OF THE REGISTRAR GENERAL OF ENGLAND AND WALES FOR 1922.

The Review of the Registrar General for England and Wales for 1922 has just been issued. According to this review and the quarterly return for the last quarter of 1922 which was published with it, the natural increase of population in that year was 293,358. Infant mortality, estimated per thousand births, was seventy-seven, the lowest figure ever recorded, the next lowest having been eighty in 1920. There was no infantile diarrhea due no doubt to the wet summer, which was in this respect a blessing in disguise. Generally speaking the year was healthy and the death rate lower than prewar rates, which seems to dissipate the idea that the postwar population would be relatively more unfit than the prewar population. The birth rate is falling. The decrease, however, may be due mainly to the hard times through which we are passing. In London chest diseases, such as bronchitis and pneumonia, were the most prevalent and fatal. Heart diseases came next on the list of fatal diseases and bronchitis and pneumonia were increased considerably by influenza. Cancer, as in the past two or three years, held third place.

THE NEW DIRECTOR GENERAL OF THE BRITISH ARMY MEDICAL SERVICE.

Almost for the first time a great medical scientific investigator has been appointed to the position of Director General of the British Army Medical Service. Sir William Leishman, the new director, is easily one of the most distinguished investigators who has served at any time in the medical service of the British Army. He has held the posts of assistant professor of pathology at the Royal Army Medical School, and of professor of pathology at the Royal Army Medical College. He has been president of the Society of Tropical Medicine and Hygiene and member of the West African Fever Commission and of the Medical and Sanitary Committee of Tropical Africa. But his chief claims to fame rest on his discovery of the causal organism of kala-azar and on his investigations into the causes of tropical diseases generally. The British Army authorities have scarcely recognized their many eminent research workers as they deserved to be recognized. Sir Ronald Ross drew attention to this in a speech a short time ago. Sir Almroth Wright was in the army, but retired many years ago to pursue his researches under more favorable conditions. Several other well known medical scientific investigators have left the army for similar reasons. In this country medical science has been treated rather badly.

Medical men who have done most important work in research have been compelled to discontinue for lack of funds and really to waste their abilities in the practice of their profession in order to gain a bare livelihood. These men if they had not been hampered by want of money might have made discoveries to the lasting good of the race. In Great Britain the government has been penurious with regard to encouraging medical research because a public ignorant of its value has not demanded that it be encouraged. The public here have not been educated in this direction as they have in the United States. The rich men of America understand the benefits that discoveries in medicine leading to the prevention, relief, and abolition of disease and to the improvement of the general health, may and will confer on the community, and they devote large sums to the advancement of medical research. The wealthy here are beginning to be impressed with the potentialities of medical research and are unloosing their pursestrings more freely than formerly to aid in its development, but they are still far behind American millionaires. The general public appear to care nothing for medical research and consequently the government is slow to move. A speaker the other day, I think it was Lord Willoughby de Broke, referring to the great foresight of Disraeli, commented on the fact that that great statesman enunciated more than once that obviously true statement that the good health of its inhabitants was the greatest asset of a nation by far. However, there are few British politicians of the day who have the farseeing statesmanlike imagination of Disraeli and therefore as Sir Ronald Ross deplored allow medical research to languish because they have not the imagination and the backbone to look beyond the gaining of votes and to so endow medical investigators that they can work untrammelled by the pinch of poverty and thus give of their best. Undoubtedly this is a shortsighted policy, "penny wise and pound foolish."

POSTGRADUATE MEDICAL TEACHING IN LONDON.

On February 16th last a meeting of the General Council of the Fellowship of Medicine and Postgraduate Medical Association was held at the Royal Society of Medicine in London. A discussion took place on the recommendations of the General Purposes Subcommittee as regards a postgraduate school for London, which took the following form: 1. That the postgraduate school in London should be a school of the university. 2. That the postgraduate school should comprise, a, a central administration office; b, a large general hospital, and, c, approved special hospitals. 3. That a dean be appointed to act as the principal officer of the central organization and to direct medical study. 4. That the general hospital should contain at least two hundred to three hundred beds and properly equipped laboratories and lecture and demonstration rooms. The general hospital should be in a central situation and possess facilities for social meetings. 5. That every opportunity should be afforded for lectures on demonstrations by persons other than members of the staff of the postgraduate school and that resident and other appointments should be open to postgraduates. 6. That the general hospital of the school should be one of the existing undergraduate teaching hospitals in a central position and should not take undergraduates.

Mr. J. H. Waring, speaking on behalf of the University of London, said that the university felt strongly the need for a postgraduate school and urged the fellowship to get into touch with the university. Although the movement for the establishment for a postgraduate medical school in London while allowedly greatly needed, does not seem to make the desired progress, in fact, appears to strangely hang fire. Recently there has been more energy displayed in bringing matters to a head. Undoubtedly the organization of the scheme is not so satisfactory as it might be, but signs are apparent that some of the defects of organization will soon be remedied. Much valuable time has been lost in getting the scheme into working order and the only remark now to be made is better late than enver.

NEW EDITION OF LANGDON BROWN'S BOOK.

The second edition of Dr. W. Langdon Brown's book on the *Sympathetic Nervous System in Disease* has been issued recently by Henry Frowde and Hodder and Stoughton. The work is based upon the Croonian Lectures delivered before the Royal College of Physicians of London in 1918. This book may be termed highly instructive and interesting. The object of the author has been to illustrate the relations of the autonomic system to a few large groups of disease, as, for example, affections of the endocrine glands, of the digestive and circulatory systems and glycosuria. The main point which Dr. Langdon Brown emphasizes is the intimate interaction of the endocrine glands with the sympathetic nervous system, as well as with the reproductive organs. And this fact is enlarged upon as of first importance, if the emotional response of the sympathetic nervous system and the influence of emotion on structure are to be estimated at their true value. Sufficient attention has not been paid to the effect of emotion on the nervous system and structure in all its bearings. As a matter of fact, we are only now beginning to understand the real functions of the endocrine glands and the part they play in the causation of disease and conditions of ill health. Their close interaction then with the sympathetic nervous system and the reproductive organs is obviously a point of the greatest medical concern and must bulk largely in treatment. Perhaps a thorough knowledge of the endocrine glands is the key of all successful treatment. At any rate the more we learn of them the more we are impressed with their vital importance and the more we earnestly desire to unravel their many yet unsolved mysteries. Dr. Langdon Brown has briefly but clearly dealt with our present knowledge of the sympathetic nervous system and its relations to certain diseases. It may be said that he is a pioneer in this direction and that his little book is a valuable contribution to the study of the unconscious, a study which is making progress mainly by means of the author and others like him who pursue their investigations from a strictly scientific standpoint.

THE HOUSING QUESTION AND THE MINISTER OF HEALTH.

Good houses are essential to good health, and, moreover, a sufficiency of good houses is essential to good health. Even before the war there was an inadequate supply of houses in this country and, of course, the war made matters much worse, as during the war no building and little repairing was done and for some time after the war the cost of building was almost prohibitive. The consequence is that at the present time there is a deplorable scarcity of houses, a situation which militates against good health and good morals. The policy of the government on the housing question is very unpopular, as it places a large part of the cost upon the local authorities already overburdened by rates. Workingmen cannot afford to rent these new decently built houses and therefore it is proposed that the government and the local authorities shall make up the deficit. There are other points involved one of which is that the government propose to remove the control of house rent. However, it is outside the province of a letter to a medical journal to descant on politics and it is only the intimate connection between housing and health that makes the subject at all pertinent. The Minister of Health, Sir A. Griffith Boscawen, at the time of writing, has not a seat in the House of Commons. He was defeated at the general election and has been waiting for a safe seat. It was thought that such had been found but it seems now that he will again be unsuccessful. The result of the poll will be known today. If he does not get in he will retire and a new Minister of Health will be appointed. The housing question comes within the aegis of the Minister of Health and was the cause of the downfall of its first minister, Dr. Christopher Addison.

YOUTH AND DRINK.

Lady Astor has introduced a bill into the House of Commons to prevent the sale of intoxicating liquor in public houses to young people under eighteen years of age. This bill will receive strong support.

SCIENCE MASTERS' CONFERENCE AT CAMBRIDGE.

A conference of the Science Masters' Association has just been held in Cambridge. Among the lectures of interest given was one by Mr. A. Wood on the acoustics of public buildings. This lecture was given in the Cavendish Laboratory, famous throughout the civilized world for its influence in research. Mr. Wood said that the first really scientific study of the problem of acoustics came from Professor Sabine, of Cambridge, Mass. He had decided quite definitely that the trouble with the bad auditorium was reverberation. This reverberation was the persistence of sounds sometimes for as long as six seconds after their delivery. The problem resolved itself into absorbing the sound. Professor Sabine had discovered that the introduction of cushions would reduce the reverberation. The theory had been established that the acoustics of a building depended on the material of which it was constructed, and the reverberation of an acoustically bad building could be greatly improved by the introduction of felt or similar material. There was another trouble which Sabine had solved, and this was by means of the echo photograph. The sound waves within a building and the path of any echo could be traced, and either its cause removed or the echo trapped. In conclusion, Mr. Wood remarked that it only remained to persuade architects that they should let science assist them in acoustics.

VIENNA LETTER

(*From our own correspondent*)

Vienna, *February* 22, 1923

SPIRITUAL HEALING OF DISEASES OF THE LUNG.

In a medical meeting held in Koesen, Germany, there was an interesting dispute on the spiritual healing of some diseases of the lung. This new fad has many advocates, who are going to found the World Federation of Spiritual Healers. Their motto is: "There is no bodily evil." "The freshness of the soul or its downtroddenness, the balancedness of our soul, or its impairment is the source of health and disease, respectively. We all carry in our body the germ of one or another disease," said one of the speakers, and quoted the well known saying of Prof. Robert Koch, the discoverer of the bacillus of tuberculosis: "All of us are a bit lung patients." This and other diseases are provoked later on by the thousand fights of life, according to the presence of the germs which are slumbering. A pathologist of the Vienna University Clinic, said the chairman of the meeting, who has made several thousands of dissections, has made the discovery, that very many old men die from marasmus, in whose lungs extensive tuberculotic foci are found by dissection. Some of these foci were already healed, but many are still virulent, with which they ought to have died long ago. Many eminent doctors have dealt with this question, thoroughly, but failed to solve this puzzle. Now the key of this secret has been found at last! We are able to remain healthy if we preserve the freshness of our soul, if we do not force our strength in the service of such aims, under which our spiritual energy is breaking.

Our body, the advocates of the new theory say, is only the valet of our soul; the body follows the directions which the soul issues. For, is there any body, who has not seen or felt what powerful energies can be provoked by good news, and every one of us has seen, pale, flaccid faces, which carry the scriptures of broken, careworn souls?

According to the ideas evolved at the Koesen meeting we ourselves are the governors of our welfare. He who can steer the sails of his soul with the winds of good humor, would not easily get in spiritual whirls, and is capable of removing all invasions with fresh, steely muscles from himself, and keep away the greatest enemy of our life: death.

THE SON OF THE SULTAN A DERMATOLOGIST.

It is reported from Constantinople that Zia-Eddin Hendi, Turkish Prince, son of the late Sultan, has passed the final examination at the medical faculty of the local university, and after being graduated, has commenced medical practice, as a specialist in dermatological diseases. Zia-Eddin is the eldest son of the late Mohamed Resad, and is fifty years of age. He is the first Turkish Prince who selected as a career a civilian occupation. During his university studies he was known as the most diligent and laborious student, who passed all his examinations with eminent results, and was noted from the fact that during the ten seasons he did not miss one single lecture.

THE COCAINE EPIDEMIC IN VIENNA.

As all scourges which start from the West reach also the East, so cocainism, with all its unfortunate evils, arrived in Vienna. The police authorities had already been informed several months ago that in Vienna cocaine intoxications are of daily occurrence; they could not, however, do anything until a concrete case was reported to them. This happened a few days ago, when a high State official notified the public sanitation office that he had to take his son to the Wagner-Jauregg Clinic by reason of severe toxic symptoms, arising from the consumption of cocaine, in several cabarets near the opera house. The sanitation office has handed the affair to the police in order to investigate the places where revelling with cocaine is done. They found out that almost all night localities are provided with secret rooms, where the consumption of cocaine is connected with sexual perversities. The cocaine is mostly smuggled, but great quantities are bought in apothecaries by producing out of date medical prescriptions, and fresh prescriptions are ordered in twenty to thirty apothecaries. But the worst is that they have found medical men, too, who if well paid give prescriptions for cocaine without question. This is not at all to be wondered at, if we reflect that in Vienna there are hundreds of doctors who do not earn sufficient to make it possible for them to eat meat once in three days. The public sanitation office has sent a memorandum to the Medical Chamber asking this body to instruct its members not to give prescriptions for cocaine without due indication, and shall not fail to note on every prescription that cocaine can be served only once for it!

INCREASED MORTALITY RATE IN GERMANY.

On Monday, February 7th, Professor Bumm, chairman of the Public Sanitation Office, read his report in the session of the Imperial Parliament in Berlin. According to this report the sanitary conditions, which in prewar times have been the best in the world, and enview by the most cultured countries of the globe, are steadily deteriorating owing to the scarcity of food, and lack of fuel, and lack of money for public cleanliness. This is most felt in the larger cities and in industrial centres. Meat has become a luxury for the greatest part of the population, to be indulged in only once in a week or so. The dwellings do not meet even the most modest sanitary requirements. By reason of this the mortality rate is ever on the increase. It grew from 12.6 per cent. in 1921 to 13.4 per cent. in 1922. The increase is greatly due to the spread of suicides, which took frightening proportions lately. Many infants' homes had to be closed by reason of the scarcity of milk. The mortality of children exceeds all previous records; for the majority of death among children tuberculosis is responsible.

A CASE OF INDEMNITY AGAINST PROFESSOR WAGNER JAUREGG IN VIENNA.

Anna Hoffmann, the divorced wife of a police inspector, has sued Professor Julius Wagner-Jauregg, the world known psychiatrist, for damages, arguing that she was improperly treated for paralysis in his clinic, receiving injections that have caused manifestations of lameness. She was taken from Jauregg's clinic to Steinhof into the state asylum, where she was kept imprisoned for eighteen months, according to her statement, contrary to right and law. Professor Jauregg declared that the suspicion of paralysis was quite justified in the case of the plaintiff, and in such cases it is but natural that lumbar puncture is administered, which is not connected with any danger, considering the great practice and skill of his staff in employing it. All the witnesses who have been heard verified that the plaintiff had external symptoms of paralysis and therefore the lumbar puncture was necessary. He denied that she had been illegally detained in the lunatic asylum at Steinhof. The plaintiff's complaint that she had manifestations of lameness was not true; neither he, nor his staff, not even the lay relatives or friends of the patient had ever noticed symptoms of lameness. On the contrary, he (Professor Jauregg) was very proud of the case, as being a healed paralysis, thanks to a new drug, lately introduced, and at present largely experimented with in his clinic. The jury has, of course, refused the claims for damages, and the President of the Assizes remarked, that since the Minister of Justice had allowed that certified poor people were permitted to sue one without paying the state stamps, such cases were brought before him in an exceedingly great number. This was an unjustified molestation of notable men, whose time was too valuable to spend whole forenoons before the court. He felt induced, he concluded, to send a memorandum to the Minister of Justice, to appoint a committee consisting of legal men, and delegates from the Chamber of Physicians, to conduct a preliminary investigation of all such cases before undertaking the charges against notable medical men.

Book Reviews

ENDOCRINOLOGY.

The Organs of Internal Secretion. By Ivo Geikie Cobb, M.D., M.R.C.S. New York: William Wood & Co., 1919.

In this compact guidebook Cobb gives a concise general résumé of endocrinology. Many points of value are mentioned. Of especial interest are his notes on the use of thyroid feeding. The text is clearly written and the book should prove more useful than some of the more flamboyant outbursts which have appeared recently on the subject of endocrinology. Cobb is known to the readers of this Journal through his original contributions to the special endocrine numbers.

TESTICULAR GRAFTS.

La Greffes Testiculaires. Par le Docteur Serge Voronoff. Avec 19 planches. Paris: Octave Doin, 1923.

It may be his technic or his careful selection of cases and material that causes Voronoff to succeed where others have failed. At any rate he has gone on courageously and followed a field of work which seemed hopeless at first. The technic is carefully explained in the present book and from this point of view it should be studied with care.

INTERNAL SECRETIONS

Innere Sekretion. Von Prof. Dr. Artur Beidl. Berlin: Urban & Schwarzenberg, 1922. Pp. 338. Pp. 480.

This is one of the briefest and most comprehensive works covering the field of endocrinology. It is two years since the publication of the first edition, this being the second, and at present Russian and Spanish translations are being printed. Biedl's work is well known and frequently quoted in this country. This is a helpful and very useful monograph.

PHYSIOLOGICAL CHEMISTRY

Practical Physiological Chemistry. By Philip B. Hawk, M.S., Ph.D. Eighth Edition, Revised. With two full page plates of Absorption Spectra in colors. Four additional full page color plates and 197 figures of which twelve are in colors. Philadelphia: P. Blakiston's Son & Co., 1923.

Less than eighteen months after the seventh edition left the press, this latest edition has become necessary, showing the measure of continued approval which this most excellent work has earned in the minds of teachers of physiological chemistry in English speaking countries.

The entire volume has been revised and much new matter added to include the most recent researches. Most of the new matter has been introduced under the sections on blood analysis, acidosis, kidney function, vitamines, and quantitative urine analysis. Benedict's quantitative test for sugar in urine and Folin's quantitative test for albumin, devised after the volume had gone to press, are made available in the form of an addendum in the end of the book. The author believes that these two tests mark a distinct advance in the procedures available for the clinical examination of the urine.

In its present enlarged and revised form there is no doubt but that this work will be accorded the same measure of popularity which has been given its predecessors.

IMMUNITY

How We Resist Disease; An Introduction to Immunity. By Jean Broadhurst, Ph.D., Philadelphia and London: J. B. Lippincott Company, 1923. Pp. 248.

The design of the book is to provide for nurses and general college students a brief introduction to the technical and apparently limitless field of immunity. The main principles of immunity are given in language as simple as possible, with outlines of the most important preventive and curative practices. Much attention has been given to the numerous plates and illustrations with their accompanying explanations. These constitute one of the valuable features of the book. As few technical terms as possible have been used, but when this was unavoidable; they are fully explained in a glossary appended to the volume. The author has not attempted to include in a textbook for beginners any controversial material except that necessary to a general knowledge of the subjects discussed. These subjects are: Bacteria and their effects upon the human body; active immunity; passive immunity; toxins and antitoxins; agglutinins and precipitins; opsonins; white corpuscles; lysins; vaccines; anaphylaxis.

CELLULAR DESTRUCTION.

Les Phénomènes de destruction cellulaire: autolyse, hémolyse, bactériolyse, organolyse; l'importance de leur rôle en pathologie. Par le Dr. Louis Bory, chef de clinique á la Faculté de Médicine de Paris. Préface du Prof. G.-H. Roger. Paris: Masson et Cie, 1922, pp. 212.

While an enormous amount of work has been devoted to the subject of autolysis and other forms of cellular destruction in their relation to immunity, predisposition, and anaphylaxis, the information is so widely scattered through the journals, many of which are inaccessible to the ordinary reader, that the appearance of this excellent résumé of the phenomena of cellular destruction will be welcome to those interested in the scientific aspect of the problem. The only criticism that can be made is that the author has been somewhat too amiable in his inclusion of rather doubtful investigations, which are as yet not controlled. It is therefore not always possible to judge from the text whether the writer has included the discussion of a given paper merely in order to make his monograph complete, or whether he really believes the statements which he quotes.

ARTERIOSCLEROSIS.

Die Arteriosklerose. By Dr. M. De La Fuente. Dresden: Theodor Steinkopf, 1922. Pp. 32.

This is a reprint in pamphlet form of a series of articles on arteriosclerosis that have been appearing in the *Zentralblatt für Herz und Gefasskrankheiten.* It is designed for the general practitioner and confines itself to an elementary presentation of the physiology, pathology, pathogenesis, symptomatology and treatment of arteriosclerosis. The perusal of such a summary reemphasizes in the mind of the reader our fundamental ignorance of the nature of the degenerative diseases of the bloodvessels.

HIGH FREQUENCY PRACTICE

High Frequency Practice for Practitioners and Students. By Burton Baker Grover, M.D. Illustrated with Ninety-Five Engravings. Kansas City: The Electron Press, 1922. Pp. xii-398.

This book is a response to the desire to break away from empirical pharmacy and an endeavor to establish therapy on the basis of more accurate diagnosis and the more intelligent rationale of physiology and etiological pathology. Although electrotherapy is still in its swaddling clothes and mere buncombe in the hands of many charlatans and quacks, it is nevertheless and undeniably an important branch of therapeutics. The physician owes a knowledge of the indications and proper application of high frequency currents both to the patient and to himself. Throughout this little book, physiology is the guiding principle in therapy. There are many quotations from other authors.

To one interested in this modality, this handbook is of great aid; to one who is not accustomed to resort to this form of treatment it is somewhat of a revelation. The theory and principles of high frequency currents are described in simple and direct language and the entire book is directed along practical lines. It includes chapters on medical and surgical diathermy, blood pressure, pain, and diseases of the eye. The chapter on practice includes the treatment of a great many diseases of various sorts and the author does not hesitate to say when high frequency treatment is of no practical or of doubtful value. A questionnaire is appended for the purpose of enabling the physician to test himself as to his ability to undertake this form of practice. A glossary is added. The author has produced a safe and sane publication on the subject of high frequency practice.

QUARTZ LAMP THERAPY

Anleitung und Indikationen für Bestrahlungen mit der Quarzlampe, "Künstliche Höhensonne." Von Geh. Sanitätsrat Dr. Hugo Bach, Bad Elster i. Sachsen, unter Mitarbeit von Dr. Ferdinand Rohr, Dr. Johannes Keutel, und Dr. Hans Waubke. Mit 19 Abbildungen im Text. Neunte bis elfte umgearbeitete und vermehrte Auflage. Leipzig: Verlag von Curt Kabitzsch, 1922. Pp. 205.

The literature on the subject of quartz lamp therapy is so extensive and is constantly increasing so rapidly that the authors have attempted to compile a monograph on all that is worth knowing on the subject. The various functions of the skin, such as its resorptive capacity, skin respiration, the secretion of sweat and sebum, the regulation of the heating economy of the body and its function as an end organ, must all be considered when applying quartz lamp therapy, which has a correspondingly large field of application. It is indicated in all diseases in which the stimulation of skin activity can be of use to the general organism, especially where the specific action of the ultraviolet rays is effective.

A ninth to eleventh edition of this book speaks for its popularity. Its aim is to include everything that is worth knowing about the quartz lamp and ultraviolet therapy, not as a textbook, but rather as a guide and an introduction to the subject. As there is still much to be learned of this form of treatment, only its practical aspect is considered. The monograph is divided into three sections: the first section treats of the physiological aspect of ultraviolet irradiation and its technic; the second part deals with its indications and therapy in the various groups of diseases, such as internal medicine, surgery, pediatrics, dermatology, gynecology, ophthalmology, otology and laryngology and dentistry; the third section is mainly theoretical and includes also the various apparatus used, with directions for their application. The chapter on the indications for quartz lamp therapy in pediatrics is written by Rohr, that on skin diseases by Keutel, and that on ophthalmology by Waubke. The indications for treatment in each disease are clearly mentioned. A most exhaustive bibliography, including forty-five pages and citations from the latest literature, is appended.

PSYCHOPATHOLOGY

Psychopathologie der Ausnahmezustände und Psychopathologie des Alltags. By Professor Dr. Erwin Stransky.

Zur Psychologie und Psychopathologie der Gegenwartsgeschichte. By Dr. Phil. Gaston Roffenstein. Arbeiten zur angewandten Psychiatrie, vols. III, IV. Bern: Ernst Bircher, 1921. Pp. 35, and VI, 32.

Dr. Stransky expresses in his introduction to the second of these small volumes his appreciation of the discussion which Dr. Roffenstein presents. The reader shares this appreciation of the latter's attempt to bring psychological and psychopathological interpretation into the troubled field of present history. Dr. Stransky's own study is in a somewhat different field. Yet the contrast in the two forms of treatment is an instructive one. Roffenstein has brought to bear a wide range of opinions from sociologists and an array of psychological facts. He lacks, however, a vital appreciation of the dynamic quality which lies in the instinctive life where explanation of sociological facts must be traced back to individual reactions. He attempts to utilize the findings of individual psychology but fails to grasp its place in interpretation and in practical readjustment of social difficulties. He does not manifest sufficient consideration of economic and other external facts which, with the varying attitudes of men toward them, can be appraised and understood only in relation to individual psychology.

Stransky, on the other hand, keeps himself in touch with the dynamic nature of the inner mental life as he seeks to explain exceptional states whether in pronounced psychopathological individuals or among socalled normal personalities. He, too, gathers from a wide range of authorities in the field of psychopathology whom he quotes to support his own view. Yet this he carries through with the force of an illuminating interpretation. He stresses the point that contrasts in behavior, which may amount even to a seeming splitting of the personality, denote not an artificial splitting of the psyche but rather a displacement of the energy activity due to the presence of a new constellation instigated from within or from without. He is one of those who acknowledges psychoanalysis in part but still feels himself repelled by the fancied substitution in psychoanalysis of philosophy for fact. He has not yet discovered that psychoanalysis has only uncovered certain facts which go to explain still more deeply the constellations which manifest themselves in exceptional states and actions as well as the mechanism by which they do this. Both of these small volumes are works of earnest thought and sincere purpose.

NUTRITION OF CHILDREN

Feeding, Diet and the General Care of Children. By Albert J. Bell, A.B., M.D. Philadelphia: F. A. Davis Co., 1923.

It has been rightly said that nutrition is the greatest factor to health. The most important problem that the mother who nurses her own baby has to face is the weaning period. What shall the baby be fed to make him thrive? Dr. Bell in his book greatly lessens this particular problem. Not only does it treat the nursing baby and his diet during and after weaning but includes also the nursing mother, her diet and general care. Both the normal and premature baby are considered. The nutritional value of prescribed foods is simply and clearly given so that it is readily understandable. The book is written in short paragraphs with bold faced captions between paragraphs making it as easy and comprehensible as a mother's own notebook. There are feeding formulas given for the first twenty-four hours of an infant's life until the end of the first year—given with such accuracy that one cannot fail to be impressed with the thoroughness with which the author has handled the subject. The little volume should be enthusiastically recommended to mothers.

THE EXPECTANT MOTHER

Getting Ready to be a Mother. By Carolyn Conant Van Blarcom. New York: The Macmillan Co., 1922.

Geting Ready to Be a Mother is a rather elementary volume dealing with the things the expectant mother should know. The author, in the introduction, stresses the fact that the volume is only valuable as a part of the personal care given the expectant mother by her physician. Much that Nurse Van Blarcom writes is not new to the audience to which she addresses herself but as a handbook of simple straightforward information for the pregnant woman it has its value. The book can be heartily recommended by the physician to the expectant mother. It is cheerful, well illustrated and interesting.

THE SOUL OF A CHILD

Child Psychology. I. The Soul Life of a Child in Its First Four Years. By Vilhelm Rasmussen. New York: Alfred A. Knopf, 1922. Pp. xv, 166.

This book, better than some on the observation of childhood, presents unbiased material directly from child life. Its author is a sympathetic observer with a sincere respect for the child's own position in the world, with also an appreciation of its relation to racial history. Yet there is a lamentable absence of interpretation based upon deeper observation into the dynamic forces at work in a child's mental life. It is to be hoped that the psychology of the unconscious will soon come to the attention of a writer who goes as far and yet stops as far short as this one does.

SKIN DISEASES

Lehrbruch der Hautkrankheiten. Von Professor Dr. Max Joseph. Neunte auflage. Leipzig: Georg Thieme, 1922.

The present edition of this well known publication has been abbreviated to a considerable extent at the request of the publishers for commercial reasons. The author's desire to amplify his eighth edition in all directions would have placed the cost of the work beyond the limits of the consumer's purse. Nevertheless, all of the recent advances have been incorporated.

LIFE WITH A CAPITAL L.

A Room with a View. By E. M. Forster. New York: Alfred A. Knopf, 1922.

Picture Frames. By Thyra Samter Winslow. New York: Alfred A. Knopf, 1923.

These two books, widely different in scope, treatment and style, nevertheless converge upon Life with somewhat of the same feeling. A Room with a View is a novel, the fairly commonplace story of the charming young thing acquiring breadth by foreign travel. All this is preliminary to the commonplace enough next step of finding a suitable husband and settling down to a commonplace life. Only Lucy Honeychurch is chaperoned on her tour through Italy by a neurotic, dependent, spinster cousin, whose angle upon the story sharpens into an ever more scorching focus until the whole thing takes fire under our eyes and we are confronted by that unexpected "something" which happens and which makes Life an adventure worth living.

* * *

Picture Frames is a collection of short stories of lives that are lived somehow, but with the least possible enjoyment. They are disheartening to the born romantic; like *Miss Lulu Bett,* almost too painfully true for those of us who accept a humdrum state of affairs, and ask for nothing better. A good many things happen to the characters in these stories, of course, just the ordinary little things that are all in a day's work. Nobody actually fails; some progress quite favorably. Always there is some perfectly adequate reason why no one is as happy as they thought they were going to be. For the easy custom of making the best of things; compromising; anything for the sake of peace, a home, a husband, or a bank account as the case may be, is ingrained in the American bourgeoisie. Each woman concludes that after all she is better off than the next one, and lets it go at that. Life is a thing tolerated, smugly acquiesced to, and the author of these fine little studies has flayed us unmercifully.

THE GOLDEN BOUGH

The Golden Bough. By Sir J. G. Frazer. In one volume. New York: Macmillan Co., 1922.

By condensing into one volume the salient features of Frazer's masterpiece, he has greatly enlarged his audience. For this we are grateful. The material in its encyclopedic form has hitherto appealed only to specialists in anthropology. It seemed too much of a task for the casual reader, no matter how inquisitive, to work his way through one heavy tome after another. Now he can discover, with the least effort and the greatest possible benefit to himself, that "the world is indeed full of a number of things." Particularly interesting to every physician is the exemplification given of how the primitive mind works. Patients who quickly lapse to primitive levels in the course of certain mental diseases present identical beliefs and pictures, confusing in themselves, but with this background readily understandable.

Again, the relics of primitive belief that we still carry about with us today must appeal to every student of why things are as they are. How our understanding has evolved from magic to religious concepts, from religious to scientific, is a stage of growth that opens vast new fields of thought.

IDYLLS

To Tell You the Truth. By LEONARD MERRICK. New York: E. P. Dutton & Co., 1922.

A man and a girl and a heart interest. Merrick's variations on this essential theme inevitably place his short stories among the season's achievements. They have the idyllic fragrance of one's own most idyllic love affair. Need we say more? Find yourselves pictured as you would like to be, and live with Merrick's very real friends through their curious, palpitating experiences!

BEASTS, MEN, AND GODS

Beasts, Men and Gods. By FERDINAND OSSENDOWSKI, New York: E. P. Dutton & Co., 1922.

A book of narrative which furnishes complete satisfaction to sadistic expression both for the writer and reader. In spite of the incidents being vouched for as coming from an authentic source, this could only be accepted on the basis of the author having deceived himself.

Medicoliterary Notes.

The Medical Woman's Journal for December, 1922, contains two interesting articles on phases of Italian women's relation to medicine. These are The Part of Italian Women in the Struggle Against Venereal Diseases, by Dr. Clelia Lolinni, and The Work of Women Physicians in Italy, by Dr. Carpuppino Ferrari.

* * *

The seventh annual report of the Association for Moral and Social Hygiene in England has just been issued. The association has for its object the abolition of prostitution specially regarded as a legal or tolerated institution. It is held that the attitude toward prostitution by constituted authority as a necessary evil is a hygienic mistake, a social injustice, a moral monstrosity, and a judicial crime.

* * *

The March issue of the *World's Work* contains the first of six articles by Sir Philip Gibbs on Adventures of an International Reporter. This article is the first printing, from the inside, of the famous exposition of Dr. Cook's alleged discovery of the North Pole. Gibbs was the first reporter to interview Dr. Cook, although he had the handicap of starting to Copenhagen a day later than the other press men.

* * *

An interesting study of mental pathology is to be found in the *North American Review* for March in the article by Arnold Whitridge entitled A Backwater of Romanticism. The story is that of Gérard Labrunie, better known as Gérard de Nerval, who was one of the strangest and most interesting figures in French literature during the early half of the nineteenth century.

* * *

The Crisis in Science is the title of an article in the January 13th issue of the *Living Age* by Prof. Adolph von Harnack, of Berlin University. Several reasons are given for the great catastrophe that has overtaken German science; 1, it has become impossible, on account of the enormous expense involved, for Germany to procure foreign scientific books; 2, the cost of paper and printing, and wages have increased to such an extent that German scientific works can no longer be printed; 3, savants are experiencing such difficulties in order to live at all that all their time must go to odd jobs bringing in a little money for the necessities of life; 4, German students are diminishing in number and deteriorating in quality. The writer believes that economic rehabilitation for Germany is the one means of salvation for German science.

* * *

A study of the incidence of serious morbidity among wage earners in *Public Health Reports* for December 29, 1922, shows that an increase in August and September, 1921, of typhoid fever, rheumatism, diseases of the stomach, diarrhea and enteritis, diseases of the skin, and diseases of the bones and organs of locomotion. The rate for all diseases combined dropped in October, but increased again in November. Diseases of the circulatory system tended to diminish in the summer and early fall.

* * *

Dr. Arnold Gesell, professor of child hygiene at Yale University, has written recently for the *New York Times* an article describing the investigations of the mental development of infants, now being carried on at the Yale Psychoclinic. All problems of the health and education of children, according to Dr. Gesell, "involve directly or indirectly the mental hygiene of our preschool population, handicapped, normal, and superior. The diagnostic, supervisory, and advisory functions of our infant welfare stations and child health centres must be gradually extended to include the hygiene of mental development. For all these reasons, the behavior of infancy takes on a new significance, both scientific and social. With time we are likely to become, not less, but more, interested in babies."

* * *

Dr. Robert T. Morris has a most interesting article in the January *Bookman* entitled The Literature of Quackery. Although written in popular style for lay reading, it is scientific in facts and development of argument, and should be of great value as an exposition of numerous kinds of frauds.

* * *

In the April, 1923, issue of *The Yale Review*, W. W. Keen has an interesting article on Louis Pasteur.

* * *

Two plays that are worthy of more than passing comment on Broadway now are *Peer Gynt* at Shubert's Forty-fourth Street Theatre, and *The Adding Machine,* at the Garrick. Both are Theatre Guild productions. One cannot speak too highly in praise of *The Adding Machine.* It is an excellent comedy, witty, unexpectedly droll and very effective throughout.

Peer Gynt has been very well staged with Lee Simonson's best scenic talent and a good supporting company and the only dissatisfaction with the play is that Peer Gynt himself, Joseph Schildkraut, falls short of the part. However, he is probably the best Peer that can be found today and so his deficiency may be overlooked by the general excellence of the play. Both plays are worth while seeing.

Practical Therapeutics

ADOLESCENT GOITRE.*

By Ralph R. Moolten, M. D.,
New York,
Instructor in Surgery, New York Post Graduate Hospital.

The clinical classification of affections of the thyroid gland is always difficult. A useful clinical classification (1) may be sketched as follows: 1. Goitre of adolescence, with hyperthyroidism. 2. Simple goitre, without hyperthyroidism. 3. Goitre of Graves's disease, with hyperthyroidism. 4. Goitre of adenoma, with hyperthyroidism. 5. Goitre of adenoma, without hyperthyroidism. 6. Colloid goitre, without hyperthyroidism. 7. Degenerative and malignant goitres.

Judd states that it is now generally conceded that most forms of goitre require surgical treatment for permanent relief, excepting adolescent goitre, which ordinarily responds to medical management. However, the course of the adolescent goitre varies. Whereas a large proportion subside within a few years, in other patients, the gland continues to undergo hyperplasia. In these latter cases the danger is twofold: in the first place, mechanical pressure symptoms; and, secondly, a thyroid gland that is in any way abnormal is a potential site for the development of a colloid condition, adenomata, Graves's disease, or even, more remotely, malignancy. Hence the early recognition of adolescent goitre is of the greatest importance, if the treatment is to prove not only curative for the present condition, but also prophylactic against a more serious one.

Without a consideration of the anatomical pathology, we have been able to recognize adolescent goitre as a clinical entity. Although in many cases the outstanding feature is a small, diffuse swelling of the neck, there is always a variable degree of definite hyperthyroidism. It is common custom to speak of a goitre that occurs in a young girl near the age of puberty as a physiological enlargement; but when we notice some definite aberration, that does not occur with constancy in the relatively normal individual, we may be reasonably certain of the existence of a disease process; and wherever there is disease, there is need for treatment, or at least for medical supervision.

Goitre of adolescence is not a condition that is often found in the well to do. It is commonest among those who are deprived of the comforts, and, indeed, the necessities of proper living. Youthful workers are particularly prone to be affected—schoolchildren as well as wage earners. To appreciate this fact, it is only necessary to walk along a busy, business thoroughfare in a large city at half past eight in the morning and observe the large number of female workers hurrying to their labors. Half portions of humanity most of them are—poorly nourished, poorly rested; and with a surprisingly large proportion having an enlargement of the neck.

Statistical data, relevant to the incidence of goitre among children in the adolescent age, furnish figures that are absolutely astounding. In April, 1917, under the direction of Kimball and Marine, an examination for thyroid enlargement was made of all the girls from the fifth to the twelfth grades, inclusive, in the public schools of Akron. This work was done with the permission and full support of the superintendent of schools of Akron, Dr. H. V. Hotchkiss. The boys were not examined, because of the relative infrequency of goitre in boys; 3,872 girls were examined, with the following results (2):

Normal thyroids	1688,	or	43.6 per cent.
Slightly enlarged thyroids...........	1931,	or	49.9 per cent.
Moderately enlarged thyroids.......	246,	or	6.3 per cent.
Markedly enlarged thyroids.........	7,	or	0.2 per cent.
Among these there were adenomas..	39,	or	1.0 per cent.

These figures carry their own comment. One gathers an impression of the prevalence of goitre in the young, from the fact that 43.6 per cent. of an average public school community have normal thyroid glands.

ETIOLOGY.

This phase of the subject offers a question that may be met with a great deal of speculation and conjecture; but can not be definitely answered. The accepted view at present is that goitre of adolescence is essentially a compensatory hyperplasia, with a varied disturbance in iodine metabolism. The diminution of iodine content in this type of goitre is inversely proportionate to the degree of hyperplasia. Associated with the hyperplasia of the secreting acini, is an added degree of calcium catabolism, making for a diminution in the total amount of body calcium.

On the other hand, McCarrison considers goitre in general an infectious disease; that the infection is waterborne, and that the organism belongs to the colon group of bacteria. Shepard, a Canadian, holds similar views, and likens the infection to typhoid fever.

The consensus of scientific opinion in this country tends to regard this type of goitre as a deficiency disease. Plummer, Kendall and others have irrefutably shown that iodine is essential to normal thyroid activity; that subiodism produces structural as well as functional changes in the thyroid gland; and that the physiological action produced by thyroid extract is always proportional to the iodine content. In the light of this knowledge one is constrained to accept the view that adolescent goitre is due to a relative lack of iodine; and to accept the infectious theory as an accessory factor.

The rôle of a coexisting focal infection, however, must not be too lightly considered. It occurs with a regularity too great to permit it to be held merely as a coincidence. Moreover, many of our patients show improvement only after a focal infection has been removed, or cleared up. The sites most commonly involved are the tonsils and the teeth; though, not infrequently, the gastrointestinal tract or one of the nasal accessory sinuses is the offending member.

But all young females who have a focal infection do not develop an adolescent goitre. Therefore, we must search farther afield for more remote causative factors, and run the risk of being called empirical, because of our speculation. The factors to be considered fall into two merging groups.

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*Read before the monthly conference of the Surgical Staff of the New York Post Graduate Hospital, January 18, 1923. From the Surgical Service of Dr. Charles Gordon Heyd, New York Post Graduate Hospital and Medical School.

Group 1.—Essential endocrine dyscrasia: The disturbance may occur primarily in the thyroid gland; or the thyroid gland may be involved because of a general disturbance of endocrine balance.

Group 2.—Essential disturbance of metabolism: Here the trouble can be directly traced to a faulty conduct of life such as:

Errors in nutrition.—Undereating is quite prevalent, not only from economic conditions, but because of some uncorrected physical condition that is responsible for a loss of appetite. Again, in the homes of many who pride themselves on serving a generous table the food has neither a proper caloric content, nor a proper distribution of food elements. A preponderance of animal protein and a decided lack of organic salts seem to be the most frequent mistakes. A common habit is to make luncheon consist of a succession of soda fountain atrocities, which are indubitably palatable, but which certainly do not constitute a properly balanced meal.

Unsatisfactory mental and physical hygiene.—After a confining day, recreation is sought in moving picture houses, and crowded, ill ventilated dance halls. The necessity of sufficient sleep, especially for adolescents, cannot be too strongly emphasized. The sleeping quarters, also, are often grossly improper. A lack of ventilation and an excess of occupants frequently go together. Poor bodily hygiene is a common fault. Too many do not appreciate the value of proper and sufficient bathing.

Neglect of personal functions.—Constipation is a very frequent trouble. Eyestrain is a condition that often goes long uncorrected.

Extraneous elements.—Conditions caused by environment, or situations arising in private life, often produce emotional disturbances. And frequently there is present the handicap of a poor heredity.

These various factors tend to produce a definite, subnormal species of humanity, in whom there is an insufficient amount of thyroid extract thrown into the circulation, to carry on a normal metabolism. In consequence, the only source of thyroid extract—the thyroid gland—is tapped; and in response to the call, the gland becomes overactive and hyperplastic.

In adolescent goitre, therefore, there is a reversal of the mechanism productive of other types of hyperthyroidism. In the various types of thyrotoxicoses, of which Graves's disease is a clinical example, there is an increased metabolism as a result of an overactive thyroid gland. But in adolescent goitre, the thyroid gland is spurred on to an abnormal activity in response to a call for more thyroid extract, on the part of a lagging metabolism, and may express itself in slightly plus values of basal metabolic rates.

DIAGNOSIS.

The diagnosis of adolescent goitre is a comparatively easy matter, if the patient's general makeup is studied; and not a definite syndrome of symptoms is sought. In fact, this type of goitre is not always accompanied by subjective symptoms, and a slight enlargement of the neck is the only evidence of a pathological process. A careful history and a scrutinizing investigation of the patient's mode of living are the important thing. However, several of the commoner symptoms are: 1. Nervousness, which is the most frequent chief complaint. 2. Progressive loss of emotional stability. 3. Lack of power of concentration. 4. General feeling of not being up to par. 5. Susceptibility to infectious diseases. 6. Loss of weight, in about seventy-five per cent. of cases. 7. Asthenia. 8. Dysmenorrhea, or scanty menstruation, especially in those cases which belong primarily in the endocrine group. 9. Hyperpigmentation of skin.

TREATMENT.

The treatment should never be surgical until the goitre is given ample opportunity to subside under proper management; and then, not until after puberty is well established. Operative intervention is especially advisable after this age if the enlargement begins to increase, or has undergone a biotic retrogression into colloid goitre as it most likely will make pressure or it may possibly change its form and become toxic. The points in the proper management of a case are:

1. The removal of all possible foci of infection. The teeth should be x rayed, and a tonsillectomy performed, routinely. The gastrointestinal tract must receive proper attention.

2. The establishment of a proper hygienic régime, both physical and mental. A daily bath is necessary, and this preferably in the morning; though there is no better sleep producer, for those who suffer from insomnia, than a twenty minute immersion in a warm tub, before retiring. These patients often have to be instructed in the proper use of a tooth brush, and other facts about the care of their persons, which they do not learn from their environment. Improper ventilation of sleeping quarters must be corrected. At least eight hours' sleep must be insisted upon, and in addition, if feasible, a short rest in the afternoon. Although plenty of healthful, out of door exercise should be encouraged, the patient must always stop short of fatigue. Too strenuous an application to school work must not be permitted, and this same principle applies to those of other pursuits. Any factors causing mental stress must be removed. An occasional kindly talk will often do much to remove what may appear to be an insurmountable situation to these young patients.

3. The establishment of a suitable diet. This is one with a plentiful caloric value, but with a low protein content. Especially, elements that tend to cause intestinal putrefaction, should be eliminated; and emphasis laid on wholewheat products, coarse vegetables, and other foods that help to promote proper evacuation of the bowels. Milk is an especially valuable adjuvant to the dietary, not only because of its tremendous food value, but also because of its action as an intestinal detoxicant.

4. Medication. In so much as adolescent goitre is a deficiency disease of disturbed iodine metabolism, medication must be directed toward supplying the lacking elements. The normal thyroid contains about three mgm. of iodine per gram of dried glands; twenty-five to thirty mgm. of iodine is the total storage capacity. It is clear, therefore, that only a very small amount of iodine continued over a long period of time, will give optimum results. In the Postgraduate Goitre Clinic, the usual prescription calls

for three to five drops of a saturated solution of sodium iodide, thrice daily. Another splendid preparation is the syrup of the iodide of iron (U. S. P.). This contains not only the necessary iodine, but also iron, a valuable blood tonic. The dose is from ten to thirty drops, three times a day; and for those who are under weight, it is given in a tablespoonful of olive oil. Supplying the whole thyroid gland direct is often an excellent expedient. The initial dose is one tenth of a grain of the dried gland, three times a day. This may be carefully increased, but the patient must be closely watched for any clinical evidence of overdosing. The increased calcium catabolism necessitates calcium feeding. This problem may be taken care of in the feeding, certain raw vegetables and baked potato skin being rich in this element. In addition, the administration of some such preparation as liquor calcis, in dram doses, three times a day, is indicated. As a final word, it is essential that these patients be kept under the closest observation, and frequent examinations made.

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The Nature and Management of Hyperthyroidism.—A. B. Cooke (*Western Medical Times,* July, 1922) states that when the thyroid gland produces an excess of thyroxin, tissue destruction progresses faster than tissue regeneration, resulting in hyperthyroidism—a true intoxication. The thyroid gland is a defensive mechanism against emotion and infection; when immunity is overcome, the defense breaks down. The preponderance of hyperthyroidism in women is due to their emotional nature, the stress and strain incident to sex and their greater susceptibility to infection. Many males showed hyperthyroid manifestations during the late war from continued excitement, anxiety, and fear. In response to continued excitation, the thyroid gland undergoes hypertrophy and hyperplasia with a consequent excessive secretion pouring into the circulation. When established, this condition is usually chronic with little tendency to a spontaneous cure.

The hyperthyroidism of toxic adenoma differs from that of Graves's disease only in degree; in the former the symptoms are milder, the basal metabolism is increased less and the danger is less acute. It occurs only in preexisting colloid goitres. It is still undecided just how the adenomatous tissue operates. The author believes that the difference in the two conditions consists in the amount or extent of the thyroid involvement—the whole of one or both lobes of the thyroid gland in Graves's disease and one or more distinctly circumscribed areas in the toxic adenoma.

Every case requires individual treatment, which must take into consideration that the disease also involves every organ of the body, particularly the heart. The medical and hygienic treatment must remain inadequate just as long as patients do not seek early diagnosis and treatment. Medical treatment is of value in the early stages of the disease, but it is slow, long continued and uncertain. Diet and rest are great aids. The author believes that surgery is the treatment of the future, even though the results in the past have not been strikingly successful. Radiation does not cure permanently and must be continued for a long time, while the damage to vital organs may be progressing. X rays or radium treatment is available in tiding over a crisis or in preparation for operation, but they increase the dangers and difficulties of the operation by obliterating the fascial planes and producing adhesions, erratic vascularity and less perfect hemostasis. Certain types of cases, especially toxic adenomas, are markedly refractory to radiotherapy. Where competent surgery is available it is a mistake to depend upon radiation. Surgery is the sheet anchor in the management of this disease, but it is usually deferred too long. Not infrequently a preparatory course of treatment consisting of long rest in bed, icebags to the precordium, sedatives, and other means, are necessary. Unnecessary risk may be avoided by making the first stage of the operation consist of ligation of one or both superior thyroid arteries under local anesthesia. Injections of boiling water or other irritants, as, for example, urea and quinine hydrochloride have been advocated but should be condemned. Recently radium emanations were tried with good results in the form of embedded containers buried in the thyroid. The author prefers ligation to all these procedures. Although radical operations are difficult and sometimes dangerous, the results achieved with them are strikingly good. When the pulse rate is persistently above 100 and the metabolism rate is higher than plus 30, the safest procedure is preliminary ligation.

Congenital Familial Goitre Treated Medically.—J. Bravo Frias (*El Siglo Medico,* March 4, 1922) says the patient and his brothers and sisters form a group of sporadic congenital goitres. Congenital goitre is rare in endemic regions and altogether exceptional among sporadic cases, but instances of both kinds have been reported not only in man, but among animals. Heredity, considered as a general rule of endemic and sporadic goitre, is not present in this case. Syphilis, as it usually occurs, has little influence on pathogeny, although it exists in this instance coincidently with the goitre but seems not to have a causative relation, inasmuch as goitre is present in five brothers and sisters without other specific lesions. The beneficial results obtained by the author in these children from medical treatment led him to advise a resort to organotherapy always when the phenomena of compression are not so severe as to compel a quick resort to surgical measures. The administration of iodides should not be insisted on, for children are frequently intolerant of them.

Management of Toxic Goitre with Radiation.—J. Thompson Stevens (*Canada Lancet,* June, 1922) states that metabolism tests show that at least ninety per cent. of toxic goitres can be cured by proper röntgen therapy. Radiation properly carried out is at present the method of choice in many medical centres. It does not disfigure, it is decidedly less dangerous and the results are at least as good, if not better, than those obtained by any other method. In many cases referred for radiation are the patients too ill for operation or have had operative failures. The results in these cases prove that radiation is the best method in selected cases.

Abstracts from Current Literature

ENDOCRINOLOGY.

The Interstitial Gland.—Leonard Williams (*British Medical Journal,* May 27, 1922) describes the development of the interstitial glands in the two sexes as follows: At the moment of conception, a male and a female element combine to form an entity. These two elements are constantly warring upon each other, each potentially charged with its characteristic interstitial gland which develops early in embryonic life and each one striving for the mastery. When one, say the male element, has definitely gained the victory, a penis and scrotum develop instead of a vagina and uterus; however, this victory is only temporary. In every child there remains a certain number of these antagonistic interstitial gland cells, which are only awaiting an opportunity for action and engaging in a secondary battle at the time of puberty, so that side by side with the secondary male characteristics associated with the male sexual organs, there may be some female secondary characteristics, such as a broad pelvis, a highpitched voice, a female mentality and feminine tastes, a mixture of male and female elements being found in every human being. In most persons, the balance of the male and female elements is in favor of one or the other, producing the distinctively male and female characters, but when they are nicely balanced, the homosexual being is the result.

From these considerations, two questions of social importance arise: 1, the determination of sex in a young embryo, and, 2, the proper attitude of the civilized community toward homosexuality. In regard to the latter, the author maintains that the present law on the subject requires revision, because the affected individual cannot alter or modify his nature any more than he can change the color of his hair: it is a burden cast upon him by external forces over which he has no control. In regard to the other question, he believes that by reinforcing the male element in the embryo by the administration of male interstitial gland to the mother, the victory ought to be in favor of definite maleness in the newborn child and that homosexuality ought to be preventable by the giving of the individual the same extract at the time of puberty. This, however, is not easy because of the presence of antagonists both among the endocrine glands themselves and between the external and internal secretions of the gonads.

The testicle has two sets of glands: those of the seminiferous tubules and the interstitial glands. The former secrete and external secretion and the latter a hormone. These two secretions are in a sense antagonistic. A unilateral ligation of the vas deferens produces a gradual atrophy of the seminal vesicles on the ligated side, which is associated *pari passu,* with a definite hypertrophy of the interstitial elements. This occurrence has been utilized for the purpose of rejuvenating elderly men, resulting in renewed mental and physical vigor at least for a time. Exposure to x rays produces sterility but no loss of sexual appetite, the effect on the testicle being identical with that of the ligation of the vas deferens. Alcohol and tuberculosis seem to exert a similar influence on the testicle.

In regard to the other endocrine glands, the suprarenal is predominantly a male gland; the thyroid is predominantly a female gland, but also has an effect on the male; the pituitary is under the direction of the appropriate interstitial gland, male or female, as the case may be, but seems intimately connected with the ovary; the thymus and pineal glands act as a check upon the gonads, but then there is also the directly opposite action.

The main enemies of man are toxins and his defences are the endocrines, and therefore the national course is to so husband the resources of the endocrines by protecting them from unnecessary poison, that they will be effective in times of stress. The glands in both sexes which are fatigued first are those most closely connected with the gonads—the adrenal in the male and the thyroid in the female. At the menopause, a redressing of the endocrine balance from withdrawal of the ovary causes constitutional disturbance, and at this time, small doses of thyroid (beginning with no more than one grain a day) is indicated.

In males between sixty and seventy years of age, a phenomenon similar to the menopause in women occurs as a result of the accumulation of poisons in the system. The interstitial hypertrophy following certain poisons, is a temporary effort on the part of these glands to repel a chronic toxemia, but they eventually succumb and are accompanied by a senile hypertrophy of the prostate. The results following the removal of the prostate support the view that the prostate is also an antitoxic gland.

Studies in the Transplantation of Organs.—S. Voronoff (*Repertorio de Medicina y Cirugia,* March, 1922) states that among the unicellular organisms which constitute the earliest type of living beings Voronoff tells us that cellular division goes on taking place throughout many generations without a single instance of death occurring, and when from loss of substance a colony undergoes a certain degree of retraction, instead of dying, its members are seen to unite, being rejuvenated and rendered more active by this fusion, and so going on to a new series of divisions. The ameba does not die: it may be destroyed by an enemy or by lack of sustenance, but it knows nothing of physiological death. In higher organisms the cells which approximate nearest to the primitive type are the connective tissue cells and leucocytes, which are also the most universal. A study of old age teaches that the connective tissue cells invade more and more the structure of organs, producing sclerosis, a phenomenon seen alike in the brain and the bones, the arteries and the muscles, the liver and the kidneys. When tissues are grafted they are deprived, while new vessels are forming, of nutrition by means of the circulation: during this period the differentiated cells of the graft atrophy, while the connective tissue cells endure and fill their place when circulation is reestablished. Life, the function of all the organs, is dependent on the activity of the glandular system. There is one gland which supplies a marvellously stimulating energy to all the cells of the body—the interstitial gland. As regards the manifestation of physical and intellectual qualities, a man is worth as much as his interstitial gland. Its internal secretion stimulates the vital energy of every tissue and increases resistance to the invasion of connective tissue which portends the coming on of old age. Since 1917 the author has performed more than a hundred experiments in grafting the testicles of various animals. Inserting the fragments within the tunica vaginalis in the natural location of the testicles affords a better result than when they are placed beneath the skin or the peritoneum. In goats the results attained were amazing. Distinctly senile animals renewed their vigor, appeared younger, recovered from incontinence of urine and from trembling of the limbs, put on flesh, became lively and aggressive, and regained sexual potency. Voronoff comments on the difficulty of obtaining human testicles in any quantity for transplantation, and proposes using those of simians, citing a case in which he successfully transplanted the thyroid gland of a monkey into a boy of fourteen.

Hyperthyroidism.—George R. Murray (*British Medical Journal,* June 10, 1922) divides cases in which hyperthyroidism is a prominent feature into three groups, 1, simple hyperthyroidism; 2, toxic adenoma of the thyroid with hyperthyroidism, and, 3, exophthalmic goitre. In some of the cases there may be dysthyroidism. In simple hyperthyroidism, there is a slight uniform enlargement of the thyroid with symptoms of hyperthyroidism. The early and prompt treatment of these cases is important, as otherwise Graves's disease may develop. Rest in bed for a week or two, or longer if necessary, and three to five minims of Fowler's solution are beneficial. For nervous excitability bromides may be given with arsenic; quinine hydrobromide, three to five grains, is useful with or without arsenic. X ray treatment is more valuable than treatment with drugs. In toxic goitre with hyperthyroidism a goitre either with parenchymatous or . adenoparenchymatous changes may be present for years without producing symptoms, the signs of overactivity then appearing suddenly, usually after a sudden emotional shock or accident, or a prolonged nervous strain. The goitres may or may not increase in size. If the goitre is large, the toxic adenoma should be operated upon as soon as marked symptoms of hyperthyroidism appear. Bilateral partial resection seems to be the best procedure. If operation is not available, the hyperthyroidism should be treated medically.

The treatment of exophthalmic goitre varies according to different authors. The medical treatment entails a stricter régime with prolonged rest in bed. Opinions as to the proper diet vary but further investigations are necessary to ascertain the proper diet. The specific organic preparations have not given satisfactory results. Of drugs, arsenic, bromides, belladonna, convallaria and quinine hydrobromide are the most useful. X ray treatment has proved to be of great value, as it certainly does reduce the activity of the thyroid. In the author's series twenty-five per cent. of the cases were fatal; with rest and medicinal treatment, twenty-five per cent. of the patients recovered and fifty per cent. improved more or less. Of one hundred patients treated with x rays, all are living and seventy-six per cent. either recovered completely or were able to attend to their duties. Radium is unsuitable for very severe or acute cases. In mild cases, operation is unnecessary, but if the trachea is compressed it is essential. In moderate and severe cases the opinion on surgical treatment is divided; in any case, medical treatment should be tried for at least six months and if no improvement results by that time, operation should be considered. The most suitable cases for surgery are those in which the goitre is quite large. The advantages of operation are: 1, the saving of time and the relief from the symptom; 2, the lesser risk of irreparable damage to the heart in the form of chronic myocarditis, and, 3, the complete and rapid recovery in some cases. The disadvantages are: 1, the risk to life; 2, the uncertainty of the final result owing to the difficulty of determining the removal of the proper amount of gland tissue in each case, and, 3, the tendency to recurrence after one year.

The Influence of the Endocrine System on Intraocular Tension.—J. Imre (*Endocrinology,* March, 1922) states that the normal intraocular tension estimated by the tonometer of Schiötz is between fifteen and twenty-six millimetres of mercury pressure, and when the heart stops beating it sinks to eight millimetres. Since 1910 the author has been making systematic observations with the tonometer, particularly in pregnant women. A remarkable case tested by him three years ago was a pregnant woman who showed signs of osteomalacia. Her intraocular tension was less than that of a cadaver, being even less than five millimetres. Among fifty gravid women forty-two had decidedly subnormal tension, two normal, and six high tension. Those with hypotension showed signs of pregnancy in face, hands, skin, and elsewhere, these being regarded as due principally to hyperpituitarism. Those who had hypertension looked unusually fresh and showed no facial signs of pregnancy. Intraocular tension was also found in connection with pituitary tumor. In one such case the pathological process had been arrested by x ray treatment and by a course of thyroid medication. Here tension was perfectly normal. Two untreated patients with osteomalacia had decidedly low eye tension. Of three castrated patients, two were much better as a result and these had normal tension, while the other failed to show improvement and had a subtension of twelve millimetres in both eyes. With the two who were benefited a difference of tension (23 as against 15, and 18 as against 15) remained between the eyes, a remarkable finding, since the rule is that both normal eyes in any given subject have the same tension. Hippel has found that patients with glaucoma give a positive Abderhalden reaction with thyroid and thymus. From his own observations and from the literature the author concludes that the tension is quite labile in goitrous and other thyroid patients. He finds, as a result of his studies, that a disturbance in the balance of the endocrine system causes a disturbance in intraocular tension. When the balance is restored, the intraocular tension approaches or becomes normal. Although we usually have to do with a pluriglandular disturbance, the glands that play the principal rôle in the regulation are the pituitary, thyroid, thymus, and gonads.

Endocrine Adiposity. — William Engelbach (*The Medical Clinics of North America*, July, 1922) evaluates obesity as one of the most important diagnostic signs of endocrine disorders. The increase in weight goes on in spite of a reduction of the diet and other attempts at weight reduction. Clinical evidence shows that the increase in adiposity is associated with a disturbed metabolism of fat. A classical type of obesity is specific for the hypophysis and gonads respectively. The age at which the obesity occurs and its localization and distribution are two aids in the determination of adiposity of the endocrine type.

As to age, there are three divisions: the infantile, the juvenile and the preadult or adult adiposities. The infantile hypothyroid type is characterized by the overweight at birth ,and the tardy eruption of teeth and talking and walking. If the overweight persists after the second year of life, the defect is an insufficiency of the posterior lobe of the pituitary—juvenile adiposity, without mental retardation. Adult adiposity is due to disorder of the pituitary, the thyroid, or the gonads, or a combination of these glands. Insufficiency of the gonads rarely occurs before the age of thirty-four or thirty-five; pituitary or thyroid adiposity may occur during the third decade. The later the advent of the adiposity, the more likely it is to be due to pluriglandular insufficiency and the graver the prognosis.

As to distribution, thyroid adiposity as characterized usually by dorsal hand and supraclavicular paddings and universally distributed adiposity, often transient and evanescent. Pituitary adiposity is located about the hip and shoulder girdles both. Gonad insufficiency shows an absence of adiposity, except in the trochanteric regions until the age of thirty-four or thirty-five. Early castrates show an overgrowth of the long bones and a very marked disproportion between the upper (short) and the lower (long) measurement of the body, with complete absence of subdermal infiltration, excepting the trochanteric padding. True gonad adiposity shows disproportionate mammary enlargement and also an apron of mons veneris shelving and localized trochanteric padding, with diffuse even fulness of the upper thigh down to the knees. If gonad deficiency develops after the age of twenty-five, the osseous disproportion is not seen, as the ossifying centres are then inactive. Pluriglandular obesity shows the individual characteristics of all the various types in the same individual.

The treatment depends upon accurate and early diagnosis of the gland involved or their combined involvement. Treatment should be instituted early while only one gland is affected. The desiccated gland substance should be given in salol coated or creatinin coated capsules to avoid gastric digestion. With the exception of the thyroid preparations, oral treatment is unsatisfactory and hypodermic treatment is indicated. Thyroxin should be given if the oral treatment is impossible in hyperthyroidism. To infants less than six months old, one fiftieth grain of desiccated thyroid is given once daily and gradually increased one fiftieth grain until the toxic effect (as measured by temperature and loss of weight), or until relief is obtained; in adults the criterion is the increased pulse and metabolic rate. In adult pituitary cases, 0.3 c. c. of pituitrin is given and gradually increased 0.06 c. c. per day until the intestinal reaction is produced. In children, 0.06 c. c. or less is given at first; adults receive one to 1.3 c. c. daily by mouth, which is increased 0.12 to 0.18 c. c. daily until the intestinal reaction is obtained; this dose is then increased until the signs of improvement no longer appear. In addition, the entire gland substance, ten to thirty grains, is given by mouth.

Orchic, pineal and pituitary treatments are ineffective in gonad insufficiency in the male. In the female, many good results have been seen with substitution treatment in early and late castrates, menopause cases and in eunuchoid and postoperative females. The administration of the entire ovarian substance is more effective than that of any preparation of its various parts. The author gives 0.6 to 1.2 gm. four to five times daily and ovarian substance hypodermically (one to five or six c. c. daily). In exceptional cases a large intravenous dose gives a more rapid but less prolonged effect. The dosage depends upon the reaction of the patient.

In pluriglandular syndromes, the use of a single gland is advised and after the effect of such treatment is determined, other gland substances may be tried out and added, beginning with the gland producing the most distressing symptomatology. The general dietetic and hydrotherapeutic measures must not be neglected.

Iodine Therapy of Endemic Goitre.—Eugen Bircher (*Schweizerische Medizinische Wochenschrift*, July 20, 1922) attacks the renewed agitation in favor of the use of iodine in goitre. Its use in different ways was condemned in the first half of the nineteenth century, especially when it is used in an uncontrolled manner by the laity, as a patient taking iodine ought to be under the constant care of a physician. In 1920, the author saw thirty-six cases of thyropathy following the use of iodine, even when it was used in very minute doses. In such cases the iodine content of the thyroid gland may reach enormous quantities. Frequently the only remedy is the removal of the iodine depot—thyroidectomy. This is often done too late and the patient succumbs from cardiac insufficiency. At any rate, the physiology and pharmacology of iodine, both in normal and goitrous cases, are so indefinitely defined and the experiences with it have been so contradictory that it seems a dangerous experiment to administer this effective poison to any great extent for a long time, either in the food or otherwise. The iodine prophylaxis, as it is recommended for use in the schools, has not been very convincing.

Iodine Content of the Thyroid Gland.—E. Herzfeld and R. Klinger (*Schweizerische Medizinische Wochenschrift*, July 20, 1922) report on the iodine findings in Zurich in 201 human thyroid glands during the winter, fall, and the spring: forty-five per cent. showed only slight amounts of iodine, four fifths of which contained no iodine at all. This group included 37.5 per cent. with apparently normal thyroids and 41.2 per cent. with pronounced goitre. The cases with an iodine content varying between 0.06 and 0.15 per thousand included 37.5 per cent. normal thyroids to 22.5 per cent. with goitre. The iodine content was greater during the summer than in the winter, possibly owing to the diet of green vegetables, or, the iodine metabolism may be more active in the winter. In thirty-nine thyroids from Holland, there was no appreciable iodine in only twenty-one per cent., as compared with the forty-five per cent. from Switzerland. Although there were some with a medium amount of iodine, there were also those with little or no iodine content. The domestic animals with no appreciable iodine formed 33.24 per cent., and one hundred per cent. of the Swiss cattle, hogs, and dogs tested. The food of the Dutch animals was evidently responsible for the high average of iodine content found in them. The authors state that the iodized table salt is an unconditional necessity in Switzerland, as thirty to fifty per cent. of the population have no iodine or only traces of it in the thyroid a large part of the year.

Iodine Therapy Under Scientific Control.—Max Edwin Bircher (*Schweizer medizinische Wochenschrift,* August 31, 1922) states that the physician should ascertain the condition of the thyroid gland before instituting the iodine treatment of goitre: the symptoms alone do not suffice. There is a reliable method of examination, with which the functional condition of the thyroid may be accurately determined: the basal metabolism is calculated from the consumption of oxygen, the former being completely under the control of the thyroid and every functional disturbance of the thyroid gland must express itself, therefore, in an insufficient control of the basal metabolism. The extent of such a resulting deviation of metabolism from the normal is also a measure for the functioning capacity or weakness of the thyroid. Every increase in basal metabolism contraindicates iodine therapy, but a diminution of the same allows the administration of an amount of iodine which is sufficient to return the metabolism again to the normal condition. Every excess may thus be avoided with this method.

The Thyroid Gland and Iodine in Relation to the Prophylaxis of Goitre.—F. de Quervain (*Schweizerische medizinische Wochenschrift,* August 31, 1922), in his report to the Swiss Goitre Commission, asserts that the renewed proposed methods of goitre prophylaxis, namely, the addition of iodine to the cooking salt in the way it is recommended for practice in the schools and the inhalation of air containing iodine, as practised a long time ago, especially in France, has apparently yielded no definite results: injurious effects were observed even at that time. The nucleus of the question is the proper dose. In adding the iodine to the salt, the dose must be kept below the amount effective for goitre in adults, inasmuch as the important element is the avoidance of goitre in the succeeding generation and the elimination of goitre in adults is too delicate a procedure to allow it to be carried out on so extensive a scale. In the socalled school treatment, one milligram of potassium iodide a week is sufficient. With this amount the effect of the iodine on the other organs, especially on the sexual glands, is not likely to occur in the way it appears following the larger doses used in animal experimentation. All persons showing a hypersusceptibility to iodine (also those at the age of puberty) must be excluded from this treatment, and medical control, the education of the public and the prohibition of the uncontrolled sale of iodine are necessary.

The Iodine Content of the Blood Following Thyroidectomy.—William A. Hudson (*The Journal of Experimental Medicine,* October, 1922) first determined the iodine content of the blood of normal dogs kept under laboratory conditions, and then removed the thyroid of these animals in order to determine whether the iodine content of the blood was changed. The lowest amount of iodine found in normal blood was 0.0029 mg., and the highest 0.0145 mg. The average amount of iodine in the blood of seventeen dogs before the removal of the thyroid was 0.0079 mg. After thyroidectomy the iodine content of the blood was increased. A series of experiments was performed to determine the effect of thyroid feeding on the iodine content of the blood of dogs whose thyroids had been removed. Feeding of fresh thyroid of sheep to thyroidectomized dogs reduced the iodine content of the blood so that it approximated the preoperative level. When the feeding was discontinued the iodine content of the blood was again increased.

Thyrotoxicosis.—J. M. Blackford (*Surgery, Gynecology, and Obstetrics,* February, 1922) emphasizes that: 1. The importance of early diagnosis in order to obtain a cure by surgical removal of a toxic goitre before permanent damage is done the patient. The mortality from removal of nontoxic or mildly toxic cases is almost zero in competent hands, and the net results as satisfactory as can be desired. 2. A badly damaged heart from goitre intoxication does not contraindicate surgery. Practically speaking the cardiac reserve of the patient is nearly always good enough, or can be improved by treatment until good enough, to withstand operation. The bulk of surgical mortality occurs in the badly toxic cases, not in the extreme cardiopaths. I do not remember ever having finally advised against thyroidectomy because of a bad heart, although I have repeatedly undertaken medical treatment for weeks or months before feeling the patient well enough for operation. The postoperative course has shown such remarkable relative cures of cardiac insufficiency as to more than justify the risks undertaken.

Endocrine Insufficiency and Chronic Intestinal Disease.—F. J. Sadler (*Lancet,* May 13, 1922) finds that one tenth grain of the thyroid extract administered once daily gives the best results in the neurasthenic discomforts of the climacterium and that dyspnea on exertion is an early sign of overdosing. Unexpected results were also achieved in arteriosclerosis associated with deafness and also in ovarian tumors. In deficiency edemas it aids by favoring diuresis. It has helped in epilepsy and melancholia in women. The connection between endocrine insufficiency and intestinal intoxication is shown by the improvement following the use of intestinal antiseptics. Ichthyol was found in albuminuria with chronic parenchymatous nephritis. Some chronic noninfectious diseases can be cured or improved by subcutaneous injections of heterogeneous bacillary proteins (Danysz), or by intravenous injections of peptone or heterogeneous bacillary proteins (Gow). The author recommends the use of endocrine gland substances and protein injections as auxiliaries. This is a good field for team work on the part of pathologist, nose and throat surgeon, gynecologist and general practitioner.

Calcium Deficiencies: Their Treatment by Parathyroid.—W. R. Grove and H. W. C. Vines (*British Medical Journal,* May 20, 1922) divided the diseases amenable to parathyroid treatment into: 1, Chronic toxemias, including (a) ulcerative conditions, like varicose ulcer, gastric ulcer, duodenal ulcer, erosion of the cervix uteri and gumma; b, suppurative conditions, like nasal sinusitis, tonsillitis, pyorrhea, otitis media and bacilluria; c, nonsuppurative, like rheumatic diseases, rheumatoid arthritis, osteoarthritis, chronic rheumatism, arteriosclerosis, eczema, chlorosis and sciatica. 2, Conditions of uncertain cause, like menorrhagia, prostatic hypertrophy and urticaria. All these various conditions have two common factors: a chronic toxic state, and a deficiency in the ionic calcium of the serum, due perhaps to a combination of calcium and toxin. Most of the cases reveal a primary septic focus and frequently a parathyroid therapy causes a hidden focus to become apparent by increasing the leucocytic reaction to the attacking micro organism.

Parathyroid glands have a double function: first, regulation of calcium metabolism, and second, to render certain toxic substances harmless. It is possible that continued absorption of toxins may eventually lead to partial parathyroid insufficiency and a resulting disturbance of calcium metabolism, which together lessen the resistance of the tissues, rendering them more liable to secondary septic processes. The authors conclude, therefore, that the ionic calcium of the blood becomes deficient in a chronic toxemia and therefore the septic focus must be sought and treated. Where such a condition exists, healing does not commence until the ionic calcium of the blood approximates the normal figure. Parathyroid therapy rectifies the calcium balance of the blood much more effectively than does the injection of calcium salts. Parathyroid substance is not a specific, but it renders the tissues more capable of performing their normal functions and of combating the effects of toxic processes.

Histological Constitution of the Internal Parathyroids.—F. A. Sanchez (*Revista de Sanidad Militar,* February 1, 1922) says that while the parathyroid glands proper have received much study, little attention has been given in the past to those found within the thyroid glands themselves. The author received for examination a number of such bodies removed from a man of seventy-three years. They existed in both lobes of the thyroid gland, were of medium hard consistency, grayish in color, and easy to detach from the thyroid stroma. From a study of them Sanchez concludes that, 1, internal parathyroids occur in man and correspond in histological structures to those outside the thyroid body; 2, the connective tissue capsule is thick and gives off from its inner surface partitions which anastomose in the form of a net; 3, the epithelial or secreting element consists of compact groups of cuboid cells and follicular groups of prismatic cells ;4, these easily separate into fundamental and chromophile cells; 5, even where the internal parathyroid bodies seem macroscopically separate, the capsule affords only a relative autonomy, and the normal thyroid tissue makes excursions into the interior of the glandule. In general the structure resembles that of other organs of intense secretory activity, the cells containing granules apparently consisting of a phosphorated liquid like lecithin. Phosphoric acid is one of the substances which take an active part in the formation of lecithin, and is also in close relation to calcium metabolism. Calcium is an excitant of the nervous centres and has been found in excess by MacCallum in the blood and urine of animals subjected to extirpation of the parathyroids and even in those of men suffering from tetany. From this may be inferred the possible importance of these tiny glands in investigating the pathogeny of such a disease as tetany.

The Significance of the Comparative Mortality Rates of Parathyroidectomized Wild Norway Rats and Excitable and Nonexcitable Albino Rats.—F. S. Hammett (*Endocrinology,* March, 1922) says that the mortality from tetany following parathyroid extirpation in wild Norway rats was found to be ninety per cent. In gentle albino rats it was thirteen per cent. and in untamed albino rats seventy-nine per cent. The high mortality was regarded as correlated with heightened neuromuscular activity and resultant augmented toxin formation. These reactions were considered dependent on the instincts of flight and pugnacity as manifested in fear and anger. The conclusion is significant in point of our knowledge of tetany. If a function of the parathyroids is to facilitate excretion of guanidin or methyl guanidin, the toxic product of muscle activity, then removal of the parathyroids or interference with their function leaves the toxin to continue circulating in the blood. Consequent high neural and muscle tension are the result in animals where fear maintains a greater excitability, and a lower or chronic toxemia is seen in calm animals, where the muscle tone is low because of the high threshold of the nervous system to exogenous stimulation. Upon this basis, although not fully so explained by him, Crile is accustomed to have his patients undergo a preliminary period before operation of familiarization with the procedure of anesthesia, in which by education fear is lessened.

Acromegalic Syndrome of Late Heredolues.—Gazzolo (*La Presna Medica,* Argentina, 1921, No. 21) states that the study of hereditary syphilis should not be limited, as it has been, to fetal syphilis and to the early manifestations of the affection. Late manifestations possess great importance. Delayed heredolues attacks principally the glands of internal secretion. The author describes an instance of acromegaly in a woman of twenty-eight thought to be due to hereditary syphilis, since she had no other hereditary taint of consequence and the stigmata of heredolues were evident in her, such as high palatal arch, prominent forehead, slightly unequal pupils, rough tibiæ, and the achromic and anectodermic cicatrices on which Castex lays so much stress for their semeiologic value. The age of the patient corresponded not only to that at which the manifestations of acromegaly are seen with most frequency, but to that of the most abundant evidences of delayed hereditary syphilis according to Fournier's statistics. After a course of mercurial treatment the patient improved, her headaches disappearing, and her menstruation, which had been absent two or three months, becoming regular. The Wassermann had been negative, but became positive after the treatment.

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NEW YORK, WEDNESDAY, APRIL 4, 1923

Hypopituitarism and Its Treatment.—H. Lisser (*Endocrinology,* January, 1922) gives an enumeration of the hormonic manifestations of hypopituitarism in the osseous system, as dwarfism and acromikria; in subcutaneous tissue, whether as extreme emaciation or extraordinary obesity, the latter usually of the girdle form; in the skin, which becomes dry and smooth as a rule, pale and waxy, inelastic and lifeless, sensitive to slight trauma, and rarely perspires; in the hair and nails, the distribution of the former being more or less nearly that of the opposite sex, the latter showing trophic disturbances; in the generative system, where both the external and internal genitalia are apt to remain infantile and the secondary sex characteristics to fail to appear; in metabolism in the forms of the polyuria and polydipsia of diabetes insipidus, of glycosuria, and of increased carbohydrate tolerance; in the muscular system, as increased strength, endurance, and muscular power, or as muscular weakness and fatigability; in mental and emotional disturbances, among them epilepsy in a few cases and retarded mental development, and possibly in disturbances of temperature, pulse rate, and blood pressure. Lisser groups the signs and symptoms of hypopituitarism in, 1, the Lévi-Lorrain type of pituitary infantilism, manifesting skeletal undergrowth with genital aplasia but without adiposity; 2, the Fröhlich type of dystrophia adiposogenitalis, skeletal undergrowth with genital aplasia and adiposity, and 3, the Neurath-Cushing variety, skeletal overgrowth with genital aplasia and adiposity. Histories of ten cases are given to illustrate these types as they occur both prior to and after adolescence in the male and the female. The etiology of pituitary hypofunction may be found in heredity, in infectious disease, in tumor, trauma, or a foreign body, or in a disturbed function of some other endocrine gland. In the present state of knowledge prognosis is necessarily very uncertain, the best hope existing where diagnosis is early and treatment long continued. Pituitary therapy is at times brilliantly successful, often worth while, and encouraging if persisted in long enough, but sometimes rather disappointing. The great hope of the future lies in the identification and isolation of the actual pituitary hormone or hormones and their manufacture synthetically.

Parathyroid Lesions in Paralysis Agitans.—Victor C. Jacobson (*Albany Medical Annals,* June, 1922) reports a typical case of paralysis agitans which at autopsy showed a marked atrophy and fatty degeneration and infiltration of the parathyroids. A rational interpretation of the parathyroid changes in the light of a possible central nervous lesion would seem to be that the parathyroid lesions may quite as will be primary and the degenerative changes in the brain secondary. The parathyroid glands should be examined in all fatal cases of paralysis agitans, as the muscular rigidity suggests subnormal parathyroid function.

Visual Disorders of Parapituitary Origin.—F. Poyales (*Revista Cubaña de Oftalmologia,* October-December, 1921) states that the anatomical relations of the pituitary gland to the chiasm are so intimate that fifty per cent. of glandular disorders are attended by visual disturbances. Pituitary enlargement produces two classes of visual alterations, functional and organic. Among functional changes occur mononuclear alteration of the field of vision, modifications of the blind spot of Marioette, disturbances of stereoscopic vision, changes in the monocular visual field, and macular symptoms. The organic changes include lesions of the fundus and disturbances of the intrinsic and extrinsic eye muscles. Hemianopsia commonly appears earliest and calls definite attention to increase in the size of the pituitary: Uthoff says it is present in fifty of every hundred cases.

A Case of Acromegalic Gigantism.— Couce and F. Poyales (*La Pediatria Española,* 1920), with comments by J. S. Fernandez (*Revista Cubaña de Oftalmologia,* October-December, 1921), report the case of an eight year old girl who was large at birth and grew rapidly, being when examined as large as a child of twice her age. Among points of special interest at the examination was the small quantity of urine passed in twenty-four hours, leading the authors to believe the deficiency caused by hypertrophy of the anterior pituitary lobe, a lesion which others also have found to have an antidiuretic action. To the same anterior hypertrophy they attribute an increase in blood pressure shown by the patient. In the leucocyte count fourteen per cent. of transitionals were found and five per cent. of eosinophiles, both being in excess of the normal: the authors do not regard the excess as a leucocytosis, but merely as indicating a hyperproduction of young leucocytes in the abundant marrow of unusually large bones. The right eye was found normal, the left completely devoid of vision, a condition ascribed to probable compression of the left optic nerve very near the chiasm by a hypertrophic outgrowth of the anterior pituitary lobe. Extract of the posterior and middle lobe of the pituitary was administered, and amputation by the nasal or subfrontal route of a portion of the anterior lobe was advised.

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Radium in Carcinoma of the Breast: A Necessary Preoperative Routine*

By GEORGE STUART WILLIS, M.D.,
New York,
Visiting Physician and Director Radium Department, New York Post-Graduate Medical School and Hospital; Director Radium Department, All Souls Hospital, Morristown, N. J.

Mammary carcinoma comprises more than eleven per cent. of cancer in women, and the present day treatment is early surgical removal. Ewing states in his recent book, *Neoplastic Diseases,* that in 180 A. D. wide dissections and cautery were used in the treatment of carcinoma of the mammary glands. Despite the fact that surgical technic has improved in the last century, statistics show each year an apparent increase in the number of deaths from cancer. Unfortunately, the laity still believes that operative measures offer permanent relief in the great majority of cases. In reality, however, the end results from surgical treatment are still unsatisfactory and often discouraging, and the use of additional therapeutic measures is the only hope for better results in the future.

In more than sixty per cent. of the cases the axillary nodes are palpable at the time the patient comes for examination, and in this type of case Ewing is of the opinion that where operation is performed only one cure in twenty-five may be expected. Willy Meyer states that he has not operated in a single case in which there was no axillary lymph node involvement. In 23.4 per cent. of Halstead's cases with microscopic negative axillæ, death from metastasis occurred. Deaver asserts that approximately one patient in five is relieved by operation and that this would be materially lessened if inoperable cases were included. Surgical statistics, as compiled by American and foreign writers, show that on an average thirty-five per cent. of the patients operated upon for carcinoma of the breast are alive at the end of three years, and twenty-five per cent. at the end of five years.

Handley states that recurrences now are mainly of the intercostal and supraclavicular types. He urges that cases must be received earlier and that some method must be devised to deal successfully with these recurrences. He states further that radium should never be omitted in the treatment of metastasis of the supraclavicular glands. If movable, they are removed and radium applied; if fixed, they are considered inoperable and radium alone is used.

OPERATIVE END RESULTS IN CARCINOMA OF THE BREAST.

Surgeon	*No. of Patients*	*Alive Three Years Per Cent*	*Alive Five Years Per Cent*	*Alive Ten Years Per Cent*
Judd	514	44.7	39.8	32.5
Greenough	320	20.9	..	..
Buchanan	153	38.	23.5	..
Warren	100	26.	..	..
Deelman	245	..	30.6	..
Brosstrom	256	29.2	23.	12.1
Halstead	210	25.6	..	..
Gassmayer	93	37.7	20.3	..
Franken	75	26.5	..	..
Meyer, Willy	68	32.3	..	..

As to the causes of surgical failures, we may mention, first, the impossibility of removing all microscopic cell nests, irrespective of the ability of the surgeon. We must also remember the wide distribution of the lymphatics of the breast to the axillæ, to the supraclavicular and infraclavicular regions, across the median line to the opposite breast, to the intercostal spaces, to the mediastinum, and over the upper quadrant of the abdomen thereby reaching the liver. Secondly, poor technic, including incomplete operations. We see recurrences frequently where the tumor has been removed leaving the remainder of the breast in sight. Thirdly, manipulation of the breast at the time of operation which may be sufficient to produce implants and metastasis. Francis Carter Wood has shown that massage of the tumors in rats and mice will cause a rapid metastasis to take place. And, lastly, previous to operation the patient may have had many examinations, and the lymphatic extension may have been caused by these procedures.

Radium postoperatively and in recurrences has given results which justify its use, but the most suc-

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*Read before the Atlantic County Medical Society, Atlantic City, New Jersey, March 10, 1922.

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cessful results will be obtained when radium is used as a routine measure, preoperatively. To understand thoroughly the use of radium preoperatively, the action of radium upon normal and abnormal tissue must be known. The first effect of radium is hyperemia; second, swelling of all the cells including the nuclei; third, degenerative changes, liquefaction, and the absorption of the colloidal material into the circulation; fourth, the formation of stroma and the replacement by fibrous tissue. The preoperative uses of radium are to disintegrate the tumor mass and cell nests and to form fibrous tissue masses which block off the lymphatics and prevent the dissemination of the tumor cells.

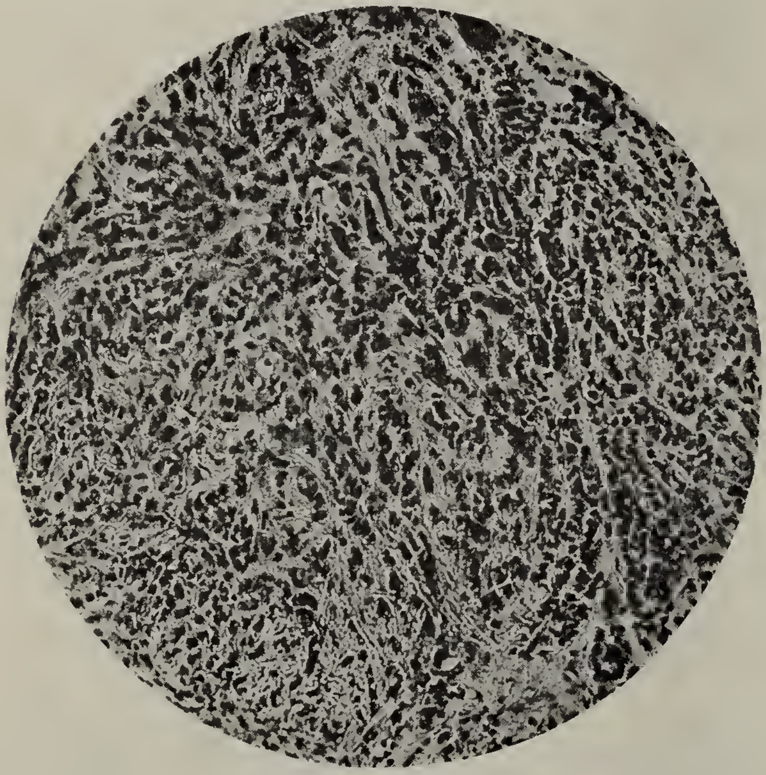

Fig. 1.—Specimen showing typical scirrhous carcinoma before radium application.

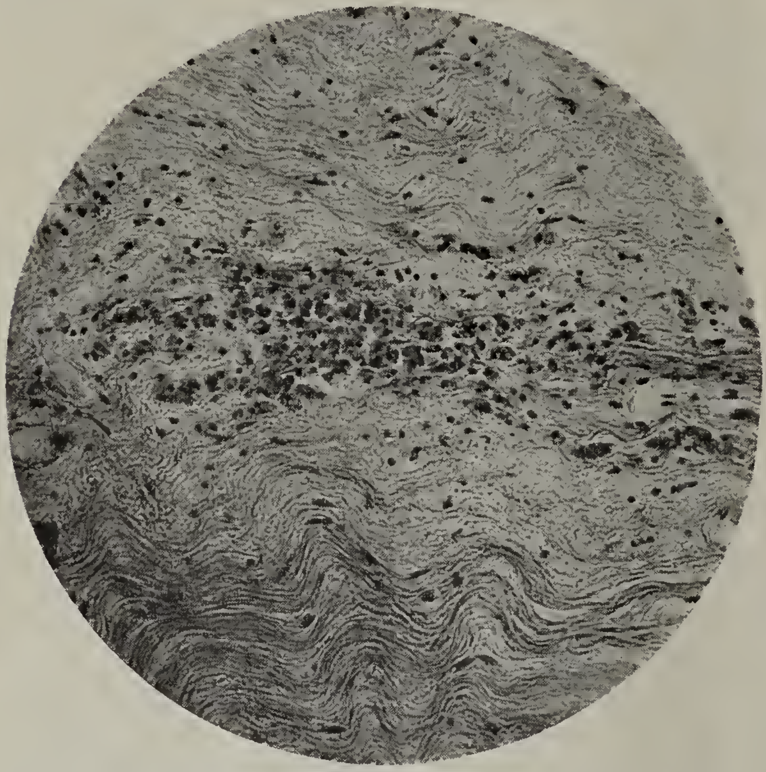

Fig. 3.—Section of degenerative malignant cells completely surrounded by fibrous tissue.

EVOLUTION OF RADIUM TECHNIC.

The early technic of radium application was entirely from a superficial viewpoint. A lead box three by five cm. and two mm. in thickness was used, containing one hundred to two hundred mg. of radium in glass tubes. This box was placed on the growth and remained there for twenty-four hours; the box was then changed to a different position and remained another twenty-four hours. Frequently a patient would receive a total of 35,000 mg. hours in one week.

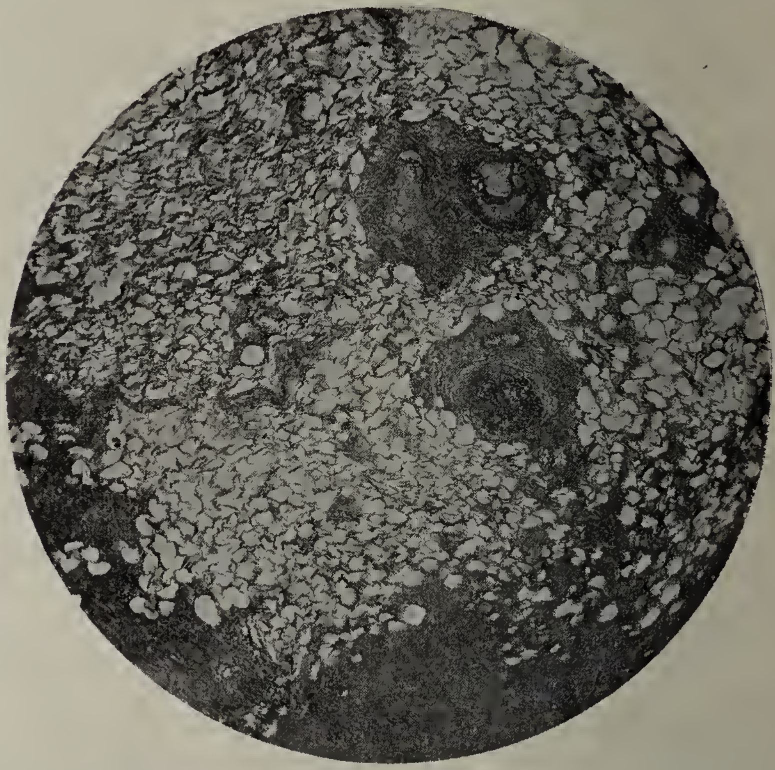

Fig. 2.—Specimen showing degenerative action of radium upon malignancy; resulting fibrous tissue.

It may be interesting to note that the patients treated at this time showed the existence of a radium toxemia, to which I was the first to call attention. This toxemia was so profound in many cases that it was necessary to reduce the dose. The size of the dose was determined by the hemoglobin and the red cell count, which were taken daily. It was also noticed in treating these cases that the resulting destruction of tissue continued for a month, and since that time it had been our habit to give as much

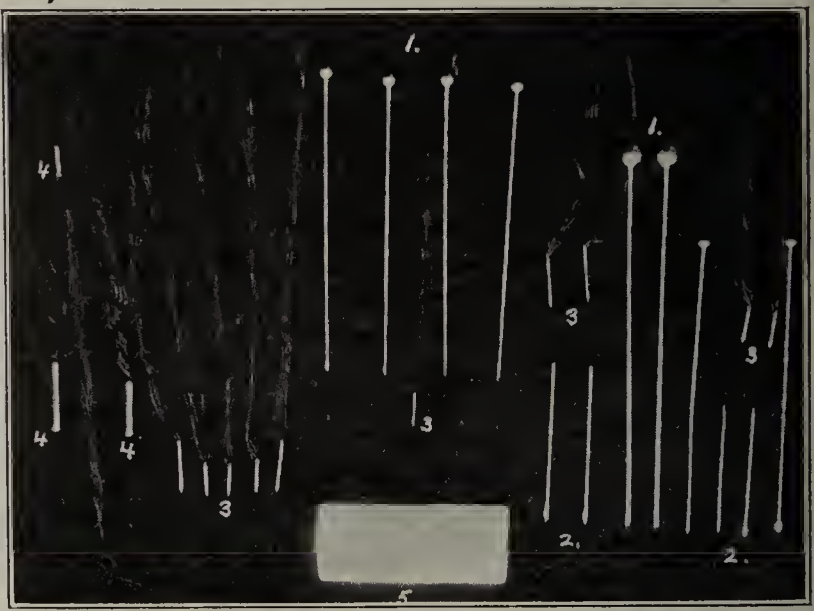

Fig. 4.—1. Transfixion needles, fifteen cm. long, each containing 33.33 mgs. of radium. 2. Radium needles, ten cm. long, each containing twenty-five mgs. of radium. 3. Short needles, each containing five to twelve and one half mgs. of radium. 4. Radium tubes containing thirty mgs., sixty mgs., one hundred mgs. 5. 2.5 cm. block screened with one mm. of lead.

radium, monthly, as the physical condition of the patient could stand. At present, the dose is decided upon after a complete blood count and a urinary analysis have been made. If the kidney is below normal in function a phenolsulphonephthalein test and a chemical blood examination will decide whether the doses will be moderate or large.

Later the introduction of radium sulphate in needles revolutionized radium therapy completely, and the present day efficiency of radium treatment in carcinoma of the breast may be attributed to the possibility of implanting these needles into the growth. These needles, two cm. in length, containing from five to twelve and a half mg. of radium, were inserted into the growth in a stellate form, one cm. apart. Recurrent nodules and large lymph nodes were treated in a like manner. The needles were allowed to remain in place from eight to twenty-four hours depending upon the density of the growth. The lymphatic chains, including the axilla, supraclavicular and infraclavicular regions, and the intercostal lymphatics, were rayed, using six hundred mg. hours to each two inches square.

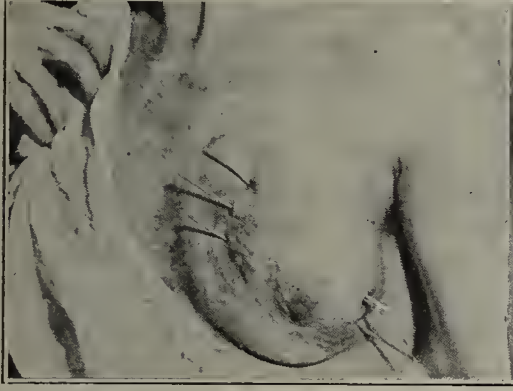

Fig. 5. — Showing three transfixion needles, fifteen cm. long, each containing 33.33 mg. of radium. These are usually left in place for twenty-four hours.

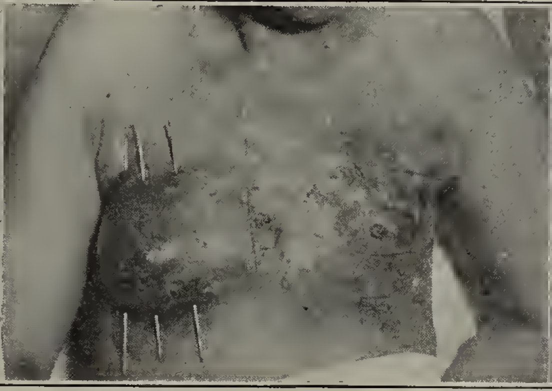

Fig. 6. — Inoperable carcinoma of both breasts. Tumor in left breast treated with radium needles and surface application. The transfixion needles are inserted into the tumor mass of the right breast.

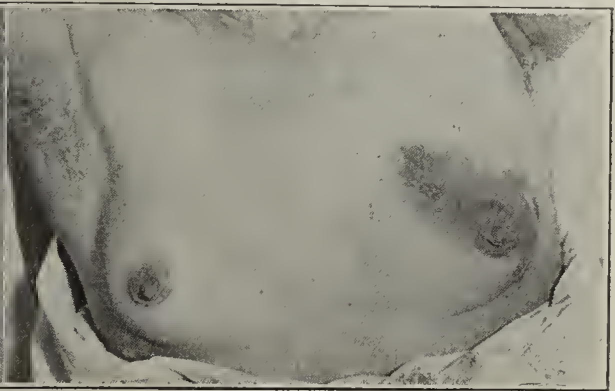

Fig. 7.—Reaction one week after the use of transfixion needles for twenty-four hours. Erythema, swelling and slight ulceration are present.

In the past year my technic has been improved further by the use of a specially constructed needle which I term a transfixion needle, fifteen cm. long, containing 33.33 mgs. of radium. The use of these needles became necessary in order to block off larger areas of tissue and at one treatment ray the entire breast. If it were necessary we reinforced with smaller needles, ten cm. long, containing twenty-five mgs. of radium buried deeply into the initial growth. Gas oxygen anesthesia is usually necessary for the introduction of these needles, and they remain in place for twenty-four hours. On the following day or within a week the surrounding tissue, including all the lymphatics, is thoroughly radiated giving each area 1,000 mg. hours and using the Mayo block.

As a result of our treatment marked erythema is noted over the skin area covering the site of the needles within twenty-four hours. For a week or ten days little change is noted macroscopically. About the end of the second week the breast becomes swollen and tender, and areas of softening are noted. During the third week the breast becomes more swollen and tender, and changes similar to an inflammation are produced. The skin about the needle openings becomes violently red and blistered. The tumor mass becomes very soft or apparently disappears. About the end of the fourth week the breast begins to assume a normal appearance. We frequently note that it may be seven or eight weeks before the breast has contracted and becomes normal, and surgical treatment is not advisable until this stage is reached.

We do not know the best surgical procedure to adopt but at present we feel that in advanced cases the breast should be removed by a simple elliptical incision without wide dissection of the axillary glands unless they are sclerotic. Within six weeks after the operation we advise a complete raying along the scar and surrounding lymphatics.

I feel, personally, that until the dosage which we use has been more definitely proved it is best for the patient to receive a radium treatment once every three months for a year.

REPORT OF CASES.

Case I.—Mrs. C., aged fifty-four, was referred by Dr. Clifford Mills, of Morristown, N. J., in September, 1919. She had had an inoperable carcinoma of the left breast for two years, and for a year and a half had been treated by Christian Science. Examination of the breast revealed the presence of large masses throughout. The axillary and supraclavicular nodes were enlarged. The entire breast was reddened and apparently about to ulcerate. The nipple was markedly retracted. The blood examination showed 3,000,000 red blood cells to the c. c. with a hemoglobin of fifty-five per cent. During September, October, and November, 1919, the patient received several radium treatments; the total was approximately 15,000 mg. hours. In January, 1920, the general condition of the patient showed such marked improvement that the case had become operable. An elliptical incision was made, not disturbing the axillary and supraclavicular regions. The pathological report was adenocarcinoma. The patient received, approximately, five radium treatments, postoperatively, over the various lymphatic areas. Today, March, 1923, the patient is in good physical condition, able to do her housework, with no sign of recurrence.

Case II.—Mrs. M. P. C., aged sixty-eight, was referred by Dr. Charles Gordon Heyd, in November, 1919. She had a tumor in the left breast, three cm. in diameter, and the axillary nodes were involved. On November 10, 1919, a specimen of the tumor was removed for examination. The pathological report was scirrhous carcinoma. During the interval between November 10, 1919, and March 10, 1920, the patient received four radium treatments, a total of 1,600 mg. hours. On March 11, 1920, the breast was removed with a moderate dissection of the axilla. The last radium treatment was given on March 15, 1920, and to date, April, 1923, there is no evidence of recurrence.

CASE III.—Mrs. B. D., aged fifty-five, came for examination on March 2, 1921, presenting a tumor in the right breast, which had been present for one year. This tumor was four cm. in diameter and the axillary glands were palpable. On March 2, 1921, a specimen of the tumor was removed for diagnosis, and four 12.5 mg. needles and one twenty-five mg. needle were inserted into the tumor mass for eight hours. The pathological report of the section taken showed a typical scirrhous carcinoma. The record of radium treatment was as follows:

March 2, 1921, four 12½ mg. needles and one 25 mg. needle		20 hours	1500 mg. hours
March 8, 1921	120 mgs.	20 hours	2400 mg. hours
April 21, 1921	100 mgs.	18 hours	1800 mg. hours
May 26, 1921	operation		
September 29, 1921	120 mgs. 60 mgs.	18 hours 6 hours	1800 mg. hours 360 mg. hours
Total			8160 mg. hours

On May 26, 1921, eighty-five days after the needle application and thirty-five days after the last radium treatment, the breast was amputated.

The pathological report was as follows: Gross: Specimen is a breast without pectoral muscles. Near the nipple is a depressed scar of a former incision. On section a firm mass of cartilaginous consistency is seen close to the nipple about twenty mm. in diameter and continuous with the cutaneous scar. It shows numerous opaque spots about one mm. in diameter on a somewhat translucent background, and there are a few small hemorrhagic spots in it. At one side it is continuous with a rounded area in which there is a small cyst containing disintegrating blood. Microscopic: Two sections were made including the skin, the fibrous tissue and the cavities filled with hemorrhagic material. The epidermis is thin except at the margin of the scar where it is thickened and irregular. The supporting fibrous tissue is dense and hyaline, and partly scar tissue. There are large thin walled and dilated bloodvessels near the surface. Plasma cells ensheath the vessels throughout, and plasma, round and eosinophile cells appear diffusely in the fibrous tissue but chiefly near the surface and near the line of the scars. The fibrous tissue shows a gradual change from viable parts to necrotic tissue, and disintegrating blood fills the cavities. Here one may see occasional shadows suggesting former cystic spaces lined by one layer of large epithelial cells, now necrotic. In the fibrous tissue one searches in vain for mammary gland cells; there are one or two isolated strands of cells resembling compressed ducts or clefts with necrosing walls lined by necrotic epithelium. The carcinoma seen in the first tissue submitted to us cannot be recognized in this specimen. One irregular cleft in the fibrous tissue is about one mm. in diameter and has walls staining pale blue and is lined by flat cells and mildly infiltrated by round, plasma and eosinophile cells. This we interpreted as a needle pathology.

The diagnosis was breast showing scar tissue resulting from radium treatment after excision of carcinoma. To date, March, 1923, the patient is in good physical condition and has had no recurrence.

CASE IV.—Miss M. N., aged fifty years, had had a mass in the right breast for one year. The axillary glands were palpable.

Preoperative radium treatments were given as follows:

August 10, 1920	120 mgs.	24 hours	2880 mg. hours
August 24, 1920	120 mgs.	19 hours	2280 mg. hours
September 22, 1920	120 mgs.	16 hours	1920 mg. hours
Total			7080 mg. hours

On October 9, 1920, radical excision was made. The pathological examination showed marked increase in fibrous tissue, and scattered throughout this connective tissue were clumps of swollen and disintegrated cells. The lymph nodes also showed infiltration with epithelial cells. The pathological diagnosis was scirrhous carcinoma of the breast and metastasis to the lymphatics. On November 19, 1921, 135 mg. of radium were given, postoperatively, for twenty-four hours. At the present date, March, 1923, the patient's physical condition is splendid and there is no evidence of recurrence.

CASE V.—Mrs. N. L., aged sixty, was referred by Dr. Charles Gordon Heyd in December, 1920, She had a mass in the left breast which had been present for one year; the nipple was inverted and the axillary glands were involved. Dr. Heyd considered this case inoperable. Preoperative radium treatments were given as follows:

December 21, 1920	60 mgs.	21 hours	1220 mg. hours
December 23, 1920	120 mgs.	15 hours	1800 mg. hours
December 30, 1920, four 12½ mg. needles (inserted in the growth)		22 hours	1100 mg. hours
Total			4120 mg. hours

On February 14, 1921, a dinner plate excision of the breast was made. There was no axillary dissection. Pathological diagnosis was scirrhous carcinoma of the breast showing extensive necrosis. On February 21, 1921, sixty mg. of radium for sixteen hours were given. On May 2, 1921, the patient returned to the hospital with a swollen gland in the left anterior triangle of the neck which was diagnosed as a malignant lymph gland. The pathological report showed it to be an inflammatory cyst of the thyroid. On August 15, 1921, an axillary dissection was made and the lymph nodes showed densely fibrous tissue diffusely infiltrated by epithelial cells. To the present date there has been no recurrence.

CASE VI.—Mrs. W., aged forty-six, was referred by Dr. Harold Meeker, on February 28, 1922. This patient had had a radical excision of the left breast nine years ago. The existence of the tumor had been known for two and a half years previous to the operation. The pathological report was adenocarcinoma. There was no evidence of recurrence until three months ago. Examination showed a mass, five cm. in diameter at the inner extremity of the scar in the fourth left intercostal space.

X ray examination of the chest revealed the root of the lung displaced two cm. to the right with bulging of the mediastinum at this place. The excursion of the diaphragm on the right side was limited, suggesting mediastinal involvement. Four 12½ mg. needles were inserted into the growth and three 33.33 mg. needles were buried in the surrounding tissue, five cm. apart. On the following day the patient received an external treatment of 120 mgs. over the various lymphatic areas for twenty-four hours.

This case is particularly interesting because of the possibility at the time of operation that cancer nests existed in the intercostal lymphatics and became completely surrounded by fibrous tissue, and it had taken nine years for them to reproduce and extend to deeper structures of the chest.

CASE VII.—M. N., single, cook. Patient consulted me on August 10, 1920, presenting a tumor, the size of a small peach, in the breast involving the nipple. The axillary glands were palpable. Patient had known of the growth for at least one year. The diagnosis was advanced scirrhous carcinoma of the breast. Between August 10th and September 21, 1920, patient received 11,160 mg hours. Operation was performed on October 10, 1920, by Dr. John F. Erdmann. Laboratory report was scirrhous carcinoma with metastasis to axillary glands with fibrous tissue after radium therapy. To date, March, 1923, patient shows no evidence of recurrence and is in splendid condition.

SUMMARY.

1. The progress of surgery in carcinoma of the breast has apparently reached its height and the future will probably show no better results.
2. Radium postoperatively and in recurrences has proved to be of great value.
3. The action of radium upon cancer cells by rendering them incapable of reproduction demands its use as a routine measure preoperatively.

The Toxemic Aspect of Ocular Disease

By PERCY DUNN, F.R.C.S.,
London,
Consulting Ophthalmic Surgeon, West London Hospital.

A toxic condition of the blood affects in varying degree the nutrition of the eye. Seven years ago I dealt with this subject in a paper contributed to the *Lancet* (1). In effect, the object of the paper was to draw attention to the numerous cases of hypothyroidism met with in ophthalmic practice.

Thyroid insufficiency may be translated into failure of the thyroid to protect the body against some source of toxemia. In such cases the gland becomes unequal to the demand made upon its functional activity, and its failure is manifested by numerous signs. It has been common in ophthalmic practice to overlook these signs: to treat the patients on general, because orthodox principles: to ignore the hypothyroid condition and the significance of its presence: to disregard the obvious fact that behind the thyroid insufficiency there must be a cause into which inquiry should be made. It has been the custom, when a toxemic condition is supposed to account for an iridocyclitis, to inquire only into some recognized focus of septic infection, as, for example, the mouth. The possibility that the eye can exhibit infective changes arising from another source of toxemia, in the course of which marked hypothyroidism is manifest, has received but little attention. The fact is, however, that the ciliary body—the blood organ of the eye—is peculiarly responsive to the effects of toxemic foci. A notable example of this is the chronic iridocyclitis known under the name of K. P. This is a disease often of prolonged duration, fluctuating always between improvement and relapse, and proverbially showing a disposition to resist the ordinary methods of orthodox treatment resorted to for its relief. Its notorious intractability to treatment is the measure of the failure to deal with its toxemic source, the existence of which is proved by the signs of thyroid insufficiency present, and the favorable influence upon the course of the disease which thyroid treatment ensures.

Closely allied to the symptoms characterizing K. P. are those accompanying interstitial keratitis in children. Such children are regarded as the subjects of congenital syphilis. But how often does it happen that we are unable to find any evidence elsewhere confirmatory of an active syphilitic taint. Even if a syphilitic origin of the disease be admitted, parenchymatous keratitis cannot be held to be a manifestation of a syphilitic process in activity. Were this to be so, on the contrary, antisyphilitic treatment, which is so commonly resorted to, could scarcely fail to check the course of the disease. General experience, however, has determined that this method of treatment has no influence in controlling the active inflammation present. Moreover, apart from the ocular signs, the small patients are generally, invariably it may be said, the dejected objects of advanced malnutrition and marked anemia. Again, they exhibit many signs characteristic of hypothyroidism.

Finally, the keratitis is secondary to an acute cyclitis, such as might be expected to follow the physical conditions present. That parenchymatous keratitis in children is mainly a toxemic manifestation is supported by the treatment which I came to adopt for its relief. The children were kept in bed, fed on a generous diet, and three grains of thyroid gland were given twice daily. As the physical condition improved, so the intense photophobia and the keratitis subsided. Atropine, with fomentations, was the only local treatment necessary. Thus the toxemia was held in check by the thyroid administration, and gradually normal nutrition came to be reestablished.

There is another disease of the uveal tract, especially destructive in its effects, suggestive also of being associated with a general toxemia. The etiology of the iridoplastic cyclitis, known under the popular unscientific name of sympathetic ophthalmia, still remains a myth. Theories abound as to its origin; nevertheless the problem is no nearer solution than was the case in ancient times. Our forefathers, greatly puzzled by the destructive incidence of the disease, willingly enough, no doubt, accepted the hypothesis that sympathy could be a cause of inflammation. Custom has led to this interpretation being retained. Ophthalmic surgery still continues to be adorned by this particular terminology, which is conceded to be a solecism, but which at the same time is a reflection upon the science of our age. The possibility that the disease may be of toxemic origin has hitherto escaped observation. Although every attempt has so far failed to isolate an organism as the causal agent, it may so be that there is one of a saprophytic type which only becomes virulent when exposed to a toxic environment. The colon bacillus is normally a saprophytic organism: in the intestines it exercises an inhibitory influence upon the putrefactive bacteria of the feces. When, however, intestinal stasis is present, the putrefactive bacteria increase; the colon bacillus becomes pathogenic, and completes the vicious circle of the pervading toxemia. The inference is reasonable that were an organism, such as we have supposed, in an injured eye to become pathogenic owing to this toxemia, its special toxin might be productive of the acute iridoplastic cyclitis in the wounded organ, to be followed subsequently, in the absence of due prophylactic measures, by the involvement of the sound one.

The vulnerability of the ciliary body to toxic infection is sufficient to imperil the recovery of an eye, either after injury or following an intraocular operation. Plastic iridocyclitis has developed even after the strictest antiseptic precautions practised in the course of an operation. The peril of the disease is by these precautions not averted. Natural repair of the tissues cannot be expected with blood infected with toxic products.

All this, of course, may be regarded as pure hypothesis. Nevertheless, it bears closely upon the theme which has been of late impressed upon me, and which it is the main object of this paper to emphasize, namely, the importance of the relationship of intestinal toxemia to ocular disease. What, again, are the facts? Hypothyroidism associated with disease changes is proof of a pervading toxemia. The toxemia is subject to control by thyroid therapy, more or less. But in the case of the toxemia arising from intestinal stasis the most scientific method of treatment must obviously be the sterilization of the putrefactive organisms in the intestines. Until recently no sterilizing process was known; no drug was available which was at once efficient and nontoxic. But all this has now been changed; thanks to the long and patient research work of Ainslie Walker, intestinal disinfection is now an established fact.

By the introduction of the new benzene derivative dimethylmethoxyphenol, the putrefactive organisms are destroyed and the Bacillus coli, owing to their greater powers of resistance (2), under the changed environment, are enabled to cast off their pathogenic virulence and resume their normal character. The significance of this addition to our therapeutic resources suggests the beginning of a new era in the treatment of disease; the fact that the poison trap of the intestines can now be brought under control may prove to be the solution of many hitherto undetermined pathological eye problems.

And not in man only will this advance prove to be effective. Animals also are subject to intestinal toxemia. Calves, for example, are the subject of a disease known as white scour. This apparently corresponds with the summer diarrhea of children, and is attended with similar fatality. Sterilization of the intestines of the affected calves has been found to arrest the disease, and recovery has followed. Some fascination undeniably belongs to the contemplation of the numerous problems of disease regarded from the aspect of intestinal tomexia and its new treatment, and the study of this subject gives promise of yielding valuable clinical results.

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Further Observations on Epidemic Encephalitis

*With Especial Reference to Mental Symptoms, Loss of Abdominal Reflexes and Myoclonus**

By I. S. WECHSLER, M.D.,
New York,
Associate in Neurology, Columbia University; Adjunct Attending Neurologist, Mount Sinai Hospital, New York.

So many clinical manifestations of encephalitis have been observed in the past few years during the various epidemics that it would seem superfluous to add further observations. The disease has become practically pandemic in this country, but it has been observed that its course as well as some of its manifestations varied to some extent during the different outbreaks. The present epidemic, which is rather prevalent, has also yielded clinical manifestations which are somewhat different from those observed in the previous epidemics, and it is perhaps worth while to record some of them. It would seem also that a few of the signs and symptoms will bear different interpretation in the light of further experience. Curiously enough, few of the many hundreds of papers which have appeared on the subject, deal with the interpretation of symptoms.

The present epidemic has thus far been characterized mainly by cases in which mental symptoms were predominant. Most of the patients have shown marked psychomotor unrest, insomnia, delirium, usually occupational in character, delusional and hallucinatory trends. In addition, abnormal involuntary movements, especially of the socalled myoclonic variety, were very common. So far the picture has not differed from that previously observed except perhaps in the greater number of fatalities. But contrary to previous experience, many of the patients showed marked diminution or total loss of abdominal reflexes. Of the last twenty-two patients studied, thirteen showed absent abdominal reflexes; three, markedly diminished and sometimes absent; one, unilaterally absent and five present. This loss was particularly noticeable in those patients with outspoken mental symptoms.

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*From the Neurological Service of Dr. B. Sachs, Mount Sinai Hospital.

It will be recalled that the presence of abdominal reflexes, and more particularly of very lively abdominals, was considered significant of encephalitis. This was true even in cases with probable pyramidal tract involvement as evidenced by an occasional Babinski phenomenon. Indeed, the presence of lively abdominal reflexes was considered sufficiently pathognomonic to weigh the scale in doubtful cases.

This association of psychic symptoms with loss of abdominal reflexes may have some significance. The path of the reflex arc for the abdominals is not definitely known. We do know that the motor pathway runs most likely in the pyramidal tract and the afferent pathway is in the sensory tracts, but it is not known just where the central arc is located. Most people believe that the centre is cortical and probably in the frontal lobe. Now it may be conceded that the mental manifestations are also cortical and probably frontal in origin. The absence of abdominals associated with the psychotic types, without any signs of pyramidal tract involvement, would seem to link the seat of the final arc with the frontal cortex. The objection may be raised that in certain cases at least the loss of abdominals may be accounted for by segmental, root involvement. This is possibly true in some cases although much less commonly than is believed; but in the numerous instances recently observed there was no local radicular involvement, and the two outstanding features were mental symptoms with loss of abdominals.

Myoclonic movements have been observed as acute manifestations of the disease as well as some of its sequelæ, although they were more significant of the former. The explanation commonly given was that they were segmental in origin, and the presence of neuralgic or radicular pain either preceding or accompanying the abnormal involuntary movement was offered as proof of the assertion. It would seem that this explanation is not correct. Certainly no involvement of the sensory root can give such myoclonic movement, nor can any lesion of the anterior root. Involvement of the anterior horn, if at all extensive and destructive, will give no abnormal movement but, on the contrary, paralysis will be noted, such as is seen in poliomyelitis. Socalled irritative lesions of the anterior horn result in fibrillation but not myoclonia. It is well known, however, that lesions of the basal ganglia do give all kinds of abnormal involuntary movements. It is further known that the site of predilection in encephalitis is the midbrain and basal ganglion region. It is therefore more plausible to assume that the myoclonias are due to basal ganglion involvement. Certainly there is not sufficient physiological evidence for the assumption that they are due to root or segmental irritation. The objection that the myoclonias occasionally occur in the region of the local pains is not insuperable; first, because they are more often not associated with any pains, and, second, it may be that the afferent impulses serve merely as stimuli which call forth the myoclonias. The further objection that there is no segmental arrangement in the basal ganglion may be answered that this is not at all definitely known, that there is some evidence of segmental arrangement and finally, that some myoclonias are due to basal ganglion involvement. This may indeed be used as proof of such existence.

However, another explanation suggests itself, namely, that the myoclonic movements are cortical in nature. In this connection I may refer to a patient observed in the present epidemic, who showed myoclonic twitching of the right side of the face and marked mental symptoms. The twitchings were rhythmical and definitely suggested a Jacksonian type. The general rhythm of all myoclonias also suggests a cortical localization.

Herpetic eruptions are perhaps unknown in encephalitis. I have recently observed a patient with typical herpes zoster involving the first to the fourth cervical region on one side. He showed mental symptoms, absent abdominal reflexes, mild myoclonic movements of both upper extremities and bilateral ptosis. This is the only instance in several hundred cases. The absence of herpetic eruptions speaks definitely against sensory ganglion or root involvement. In view of the offered explanation that the myoclonic movements are due to radicular or segmental involvement, as evidenced by the accompanying neuralgias, it is certainly strange that so few patients have shown herpetic eruptions. It is true that an attempt has been made to correlate socalled epidemic herpes zoster with encephalitis and even to isolate a virus, but the results are not convincing. In this connection may be mentioned the attempt to link the intractable pains in encephalitis with thalamic involvement, but it may be definitely stated that true thalamic syndromes have been but rarely encountered, and that most of the pains are probably radicular.

RESPIRATORY SYMPTOMS.

Some writers have called attention recently to a variety of respiratory symptoms in encephalitis which do not merit the air of novelty with which they have been put forth. But a great many different forms of respiratory disturbances have been observed. Many patients have shown typical bulbar breathing and in many instances these cases ended fatally. I have seen typical Cheyne-Stokes breathing in cases of encephalitis. Some patients had attacks of asphyxia, which in one instance, at least, were accompanied by convulsive movements. One patient showed what seemed to be clinically, although this was not proved, involvement of the diaphragm. Rapid respiration, both as an acute manifestation and as a sequel, in the absence of heart and lung involvement, was also observed. Rapid spasmodic breathing suggestive of hysteria, but nevertheless a true sequel of encephalitis, was also encountered. Recently I have observed patients after the acute attack was over, with normal temperature and respiration, and a pulse rate of 100 to 120. This points to a probable dissociation in the involvement of the heart and respiratory centres. Some patients have shown marked cyanosis apparently without signs of involvement either of the heart or lung.

Finally, by way of prognosis, it may be stated that it is most difficult to foretell the outcome in any case of acute encephalitis. Two of the patients mentioned above, one of whom showed Cheyne-Stokes respiration while in deep coma, and the other an acute attack of respiratory failure with cyanosis and convulsion, recovered. On the other hand, some cases end fatally even though there are no alarming cardiac or respiratory symptoms.

To summarize, the present epidemic has been characterized in numerous instances by marked mental symptoms associated with loss of abdominal reflexes; this may be used as clinical evidence that the central arc of the abdominal reflexes is situated in the frontal cortex. The myoclonic movements, which are also so commonly present in patients with mental symptoms, may be said definitely not to be due to low segmental involvement, but either to basal ganglion or cortical lesions. One instance of herpes in encephalitis and one of facial myoclonus, suggestive of a Jacksonian spasm, being extremely rare, are worthy of record. The presence of cyanosis without cardiorespiratory involvement and the dissociation of respiratory and cardiac disturbances, as shown by rapid breathing alone or rapid pulse alone, may also be emphasized.

1291 MADISON AVENUE.

Etiology of the Neuroses

(Second Communication)

By ALBERT POLON, M.D.,
New York.

INTRODUCTION.

There is but little in the external appearance of neurotic disease that would readily suggest its origin and cause. One could no more tell from the surface configuration alone of a functional disease as to the nature of its production than one could tell the composition and mode of formation of a mineral by merely looking at it. Similarly, a familiarity with the clinical symptoms alone of phthisis would not accord one the knowledge of the specific causative agent and of the intricate structure of the tubercle. In all instances, in order to obtain the information of the genesis of a phenomenon, it must be submitted to an analysis. For each type of phenomena to be investigated there is a correspondingly adequate method of analytical procedure. Its adequacy is determined exclusively by the service it renders and by the results it attains.

Now the specific, if not the only method eminently adapted for the examination of the mode of production of neuroses is the procedure termed psychoanalysis, invented and evolved by Sigmund Freud. Any other procedure, however justifiable it might be in other fields, bearing the designation of psychoanalysis, is misnamed. This misnomer is used much too often with a plagiaristic motive. However, this is by no means the worst feature of such an illegitimacy. The real harm resulting therefrom is the confusion created by the fact that such investigators proceeding with a method which is not psychoanalysis, are obtaining results at variance with those of the regular technic, and are too ready to dispute the analytical findings on the basis of authenticity of facts. Naturally they must fail to attain the necessary insight, to the same degree as a chemist would fail to obtain results were he ignorant of the modern methodology in chemistry or were he to use a faulty technic.

What this psychoanalytical method consists of and how it operates, is beyond the scope of this presentation. It will be considered at a later date. Here we shall treat essentially of the facts and experiences obtained by this method and of the theoretical formulation of the thus obtained empirical data, which would disclose the etiology of the neurosis.

I.

Generally speaking, the material adaptable and usable for our purpose is the mental life of the patient, not only as it presents itself at the time of examination, but what is more important also in its past history from the time of its beginning. This would include all the patient's developmental phases, all his experiences, which would reveal themselves as an interplay between the factors of environment and special constitutional features. The procedure is quite analogous to a cross and a longitudinal section of the individual's life course. Some of its elements will have their greatest connotation in terms of a transverse layer, which embraces a certain time period in all its simultaneous ramifications. Others again will derive significance from their being an end result of a causal chain, the first links of which are rooted way back in the past, in the earliest periods of growth and development.

The material thus obtained shows with a monotonous uniformity two essential characters: A persistence of infantile trends and an abnormal sexual development.

II.

Even a superficial observation of the neurotic leads to the impression that his behavior is essentially that of a child. As a rule he is not selfreliant. He fears being left alone. He is constantly preoccupied with his functions of eating, drinking, defecation, urination, about which he is squeamish, capricious, and often adheres to a special ceremonial. He is pronouncedly egocentric. All things and all persons are mobilized to concern themselves with his ailment. He is likely to show the feeling of inferiority, of being small, not grown up yet; and this distressing feeling has its compensation, in that, inordinate claims are made upon the attention and interest of those about him. Through his disease he may conscript the energies of several or all members of the family. He asks and commands devotion that would not be otherwise his, on the basis that he is helpless as a child. He is quite often impetuous or extremely reticent, shy and bashful as a child would be in the presence of strangers. Usually wrapped up in his family situation he evinces but little interest in the outside world. As a rule he regards life at large as inimical and is intimidated by what he is ready to interpret as threats. His inordinate attachment to members of his immediate family, or an unreasonable quarrelsomeness with them, is pronouncedly childish. The frequent sight of the grown up son catered to by his mother, led by the hand from one clinic or doctor to another, often dressed and washed, and hovered over by her as if he were a helpless infant in the cradle, is as pathetic as it is ludicrous and reminds one of the game of "doctor," that children like to play.

The inability of the neurotic to break away from his parents prevents him from establishing new ties of love and friendship. He cannot commence an independent love life. Hence the persistent remaining under the cover of the old home, exactly as the child must do. Excessive interest in morbid occurrences such as murder, arson, cruelty, is a common childish feature of the neurotic. He reacts to them as if he was participating in them, displaying the anxiety and fears, which children do when they listen to terrible stories. Gullibility, suggestibility, excessive enthusiasm, these marks of the child's mind are consistently found in the nervous patient. He is also incapable of sustained effort. Work and the neurosis rarely agree. There is too much childish shifting of attention.

Striking also is the fact that every neurotic shows an immature sexuality. As stated, the nervous patient lacks the elasticity and initiative in establishing new ties. As a rule his love life is circumscribed, but at all events lacks the full measure of gratification. Many show a pronounced disgust for sexual intercourse. Their love must be a continuation of the pure platonic affection for their parents. The males are frequently impotent, or suffer from ejaculatio precox, the females are often sexually anesthetic (feminine impotence) or suffer from vaginismus, thus representing an immature sexual type. Many masturbate or are engaged in some other autoerotism, in this regard resuming or not abandoning the infantile pathway. In many certain areas of the body play an unusual erogenous rôle. They constantly busy themselves at their mouths and throats, dig at their rectum, investigate their feces, interest themselves in their urine. All this is done with a concentration of attention and a degree of absorption as to suggest that they derive a large measure of erotic gratification from these activities. In this regard one need only recall the great interest children have in their excreta.

In short, without any deeper analysis than merely attentively observing what the neurotic psyche attains for itself by means of the ailment, one cannot escape the impression that this somatically mature person who walks and talks and looks like an adult, is, as far as his neurosis is concerned, in the first place a child in regard to selfpreservation as well as to his procreative function.

III.

There are two maxims prevailing among the laity concerning this paradoxical phenomenon. One is that it is the product of "imagination," and the other that it is engendered by an abnormal function of the genital organs. The first maxim explains the unsympathetic and impatient attitude toward the neurotic, even on the part of the physicians. Since under imagination is understood the conscious activity of the mind—accusations and suspicions are rampant that the neurosis is a simulation and an expression of a malicious will. The second maxim regarding the abnormality of the genitalia has found considerable credence among physicians. Ever since the days of Hippocrates malformations, malpositions, and traumatized conditions of the generative organs have been regarded as the seat of the neurosis.

These two notions have in a dim manner anticipated the truth. It was an intuitive groping in the dark, in a direction which was generally correct. It remained, however, for psychoanalysis to throw light upon the actual situation. While it has confirmed the psychic and the sexual factors as paramount in the production of the neuroses, its contribution is unique in two respects. It has found that the socalled imagination, possessing pathogenic properties is not consciousness, but the unconscious psychic process, and that the sexual disturbance does not lie in the soma but in the sexual instinct.

IV.

The analysis of the patient's mental life—this minute microscopic study of his mind—reveals that in every neurosis there is one or more ideational constellation, an unconscious phantastic structure which contains the motive for the production of the symptoms. The symptoms as a bit of behavior have a meaning and express a purpose in terms of this psychic process. The patient, as it were, is having a twofold orientation in life; one in the light of the demands of reality and expediency, and the other as a result of the phantasy, of which he is not aware. Two masters speaking different languages and having different and often opposing aims rule his mental household.

The influences coming from these sources may flow in parallel streams, each reigning supreme in its field of action. The case of the double personality, or of the conversion hysteric, indifferent to his affliction, is an example in point. Or they may encroach upon each other with the result that the patient is constantly in a state of turmoil, being torn between two contending forces. He cannot wholly obey either out of deference for the other.

Clearly this must lead to a serious impairment of efficiency—hence the anxiety, which always manifests itself wherever an organism is aware of his inadequacy to overcome satisfactorily a difficulty in adjustment.

What is the nature of this disturbing factor, which is not unlike a monkey wrench in the machinery of adaptation? All that has been said in the previous lecture about the unconscious in general fully applies to this unconscious psychic process. Its content is essentially a repetition of trends and interests, which belong to the developmental period of childhood. One may compare the unconscious pathogenic mentality to a volcanic rock, emerging in the midst of a fertile soil. It belongs to another epoch, and has for definite reasons failed to conform to the destiny of the rest of the covered layer. This atavistic stranger retains all the characters of the main stratum of childhood, from which it is a direct continuation. Its dynamic property of influencing conscious thought and inducing motor activity is derived from the forces, which are characteristic of that early period.

It is of interest that the fundamentals of the child's mind have been first studied in the mentality of the neurotic. The information obtained was gathered in fragments of varying configurations. Some of these bits were first found in hysteria, later in compulsion neurosis, also in the material of neurasthenia, and finally others again in what is known as the narcissistic or schizophrenic psychoses.

The reconstruction of these fragments established the fact that there is an infantile sexuality. An unbiased observation of the child since then confirmed directly what was at first derived by implication. One who does not deliberately shut his eyes would not fail to see that the whole of the child's love life is surcharged with the erotic quality, and that the activities it entails are distinctly sexual. This sexuality differs from that of the adult primarily in one respect—it cannot serve the purpose of procreation, but then the kind of gratification sought is the same in both cases.

What is important for our theme of the etiology of the neurosis is the fact that the infantile trends which make up the pathogenic unconscious processes are chiefly of the nature of sexual striving, characteristic of childhood.

V.

The material upon which this statement is based is produced by the patients during the analysis. It consists of reminiscences of early and late infantile sexual experiences.

These involved erotic stimulation of various parts of the body, especially of the erogenic zones such as mouth, rectum, urinary opening, nipples, but also of limbs, fingers, etc.; then again the stimulation may have been principally that of the genitalia. Some of these persisted to a late period, such as thumb sucking and masturbation. This group of activities is characterized as autoerotic.

Then again the erotic striving might have been in connection with an object choice, some person in the immediate environment, such as mother, father, sister, nurse, or governess. Many of the memories are those of gross traumata, such as seduction. Others were of the kind that are tolerated as acceptable forms of affection. Excessive kissing, viewing of the nude body of the child (passive exhibitionism), excessive petting and indulgence, sleeping with adults or bringing the youngster into the bed of the parents. Exposure of adults in the presence of the child or bathing with it. A frequent reminiscence is that of having seen or overheard the coitus of parents or other adults.

In connection with these experiences the child had formed curious infantile birth theories, in which an important rôle was assigned to the rectum. In this phantasy the child revived the evolutionary period, in which the cloaca was the seat of sexual excitation.

The feces had a connotation of a valuable part of the body, often having the meaning of a fetus. Its retention was associated with a pleasurable sensation. Its discharge was a sacrifice, a giving up of a source of gratification, as a token of love and devotion, usually to the mother. A prominent component of the memory of the infantile sex activity is the ambivalence of the child's feeling in his love life. Love and hate coexisted. There was a distinct feature of sadism and its passive form, masochism; also of passive and active exhibitionism. There was frank homosexual as well as incestuous attachment to a parent, or to the brothers and sisters.

Sadism, masochism, passive and active exhibitionism, coprophilia, homosexuality, and other manifestations are spoken of as partial sex impulses, because while in the child they manifest themselves autonomously, in the normal adult they become condensed into the unity of the mature sex impulse. Similarly the undifferentiated love striving to various persons in the household eventually becomes condensed in a strong attachment for one or the other parent. This confining of the love feeling within the limits of a parent personality is spoken of as the Œdipus complex. The partial impulses and the Œpidus complex are always found in the kernel of the neurotic material. But there are several other common complexes.

In addition the patient recalls that in his early life he was markedly egocentric. He had a sense of omnipotence, and a belief in magic. Because of his egocentricity he had an inordinate striving to dominate (the will to power). Frequent elements of the memories of childhood are plans and intentions of murder, arson, cruelty, destruction; also jealousy is a pronounced feature.

All that morality and law have condemned, all that may be regarded as a threat to civilization and social existence is uncovered as the content of the material behind the pathogenic phantasy. And yet, this is what the patient recalls, as layer by layer his amnesia is being overcome. The emerging picture is clearly conclusive evidence that the childhood of the neurotic was polymorphously perverse.

However, the most significant thing about this conglomeration of perversions is that it still exists in the unconscious, and evading the barrier of repression realizes itself in the symptoms of the neurosis. Every feature of the clinical picture, whether a bodily symptom, an abnormal affect, or a compulsive idea can be accounted for in terms of these perversive tendencies.

VI.

Puzzling is the fact that between the days of childhood and the time of breaking out of the neurosis there intervened a period of normality. The perversive tendencies are usually abandoned at about the fifth year of life. There follows, as a rule, a quiescence of all frankly antisocial erotic activity.

Upon an occasion when the tide of sexual desire rises high, such as at puberty, or when there is a difficulty of adjusting his love life, the patient suddenly swings back to the early life period and reenergizes abandoned patterns of infantile sex activity. This process is termed regression. The specific characteristic of this ontogenetic reversion is the fact that it transpires without the patient's awareness. All his conscious and foreconscious mental processes are converging to the one aim: that he may not recognize the nature and true meaning of his abnormal cravings. He is thus spared the pain and shock that might accrue to his better self, but then he becomes neurotic. The neurosis is thus a defense mechanism against the threatened pain from the source of his own infantile impulses.

In the light of this consideration we can note the following steps in the genesis of a neurosis:

1. The step of precipitation of the disease—marked by some difficulty or failure of obtaining gratification in the process of adjustment of the adult love life. In other words a conflict with external reality, which denies the gratification. This acts like a trauma. The trauma may be a single large one, or it may be engendered cumulatively.

2. The second step is that of settling the external conflict by a withdrawal from reality into the domain of phantasy, to the infantile stage of sex activity. This process is termed regression.

3. The third step is the internal conflict between the higher self of the adult personality and the newly revived infantile patterns of sex activity.

Morality, shame, and disgust in the patient prevent him from accepting the stage of regression in all its frankness. He therefore represses. This repression is only in part successful. Its meaning—that is its ideational content, is excluded from consciousness, but the impulsive energy behind the content circumvents repression. As long as it remains disguised in the form of a symptom, it is outside the range of influence from the ego, which induced its repression. The patient cannot possibly by himself obtain insight into the mechanism of its production.

Let us then bear in mind these three etiological factors of the neuroses as we proceed further. They are: 1, External conflict; 2, regression; 3, internal conflict with unsuccessful repression.

VII.

Obviously this does not cover the whole problem. Rarely, if ever, can the external difficulty be adequate enough to be the sole determinant of the regression. The potential neurotic breaks down under conditions in which most people remain fairly normal. Maladjustment of love life is much more common than the neuroses.

The neurotic then is clearly a sensitized subject. In him the external precipitating difficulty plays an anaphylactic rôle. What is the factor which produces this hypersensitiveness?

The answer to this is again to be found in the empirical data of analysis. The childhood history of every neurotic shows one constant feature, namely that his infantile sexuality has been inordinately stimulated. Whereas all children manifest sexual activities, the child who will become the potential neurotic shows an unusual intensity in this regard. There is an overloading of this or that partial impulse, or of this or that complex. This overloading traumatizes the natural course of development. It constitutes a locus minoris resistentiæ, which at the time of its occurrence may not register itself by any loud manifestation, although neuroses in children are not uncommon. But what is a pinhole at the start of growth, becomes a breach in the dam of equipment of adult life. This locus minoris resistentiæ is termed the point of fixation. The libido of the person is fixed at a certain phase of its development. Hence the tendency to regress to it.

The neurotic, fixed upon his early life, constantly harkens to the bygone. He lives in his reminiscences; he is introverted. He has not gotten through with his past experiences and is constantly returning to them. His behavior acquires a meaning in the light of a purpose to settle an unsettled situation, to abreact an unabreacted excitation.

Even in his attitude toward the analyst the patient repeats situations belonging to childhood. He may regard his physician as a father, or an older brother, or someone in former authority, and act and feel in a manner that is understandable only in the light of former experiences.

We must thus add to the three mentioned etiological factors of external conflict, regression and internal conflict, the fourth one—the factor of fixation.

Now the points of fixation have chronological earmarks, that is, they belong to definite time periods in the course of development of the infantile psychosexuality. Thus, some of them belong to the last epoch, namely, anywhere between the fourth and the sixth year of life, at which time all the partial impulses have become submerged and condensed in the primacy of the genital zone. This period coincides with the time when the sexual activity of the child is manifesting itself foremostly about the genital organs on the one hand, and on the other when the child is directing his affection to an object or person other than himself. We call this time the period of completed genital organization, and the libido, the object libido.

Another point of fixation may be anywhere between the second and fourth year of life, at which time the partial impulses still assert themselves autonomously. There is no supremacy of the genital area; the rectum, the mouth, and other areas are sources of excitation. Male and female are not distinguished at this time. The distinction is mainly along lines of activity or passivity. However, even at this early time the libido, as generated by the decentralized impulses, is mainly directed to a person or object other than the child itself. We speak of this time as the period of pregenital organization and the libido as the object libido of pregenital organization. Still another point of fixation is in the time of the first year of life, when the incoherent mass of the sex impulses are functioning mainly with regard to the body of the child itself. The activities are essentially autoerotic. The pleasure is derivable, chiefly from oneself. This period is termed the early period of autoerotism. The psychic processes accompanying it are designated as narcissistic.

This classification of the stages of infantile sexuality are highly schematic. For the purposes of clearness the lines are sharply drawn. Actually the characteristics of organization of the impulses, as well as of what constitutes the object of the libido are gradually merging from one period into the other, carrying over features belonging to an early epoch into a later one. Then again the inceptive rudiments of a later period are always found in an earlier one. Thus, for example, autoerotism is carried over in some measure to the period of object libido. The child at five is still to a certain degree autoerotic, and narcissistic, as manifested by masturbation, or in some children by thumb sucking. On the other hand the child even in the first year of life has considerable libido directed to the mother, especially to the breast and nipple of the mother.

Thus every point of fixation is likely to have the characteristics of all the different stages of development with one predominant feature, which marks by its bulk the particular developmental epoch. The particular morphology of neurosis depends upon the point of fixation to which the regression takes place, but we shall find in every neurosis some marks belonging to another neurotic entity.

VIII.

Let us also bear in mind that this state of ontogenetic atavism is disguised, so that the least likely to know its meaning is the patient himself. Now does it ever happen that this camouflage due to repression is absent? Yes, indeed. The frank perversions and inversions, which are much more common than is generally believed, are instances of regression without repression.

The thing about them of interest to us is that they are sexual cravings which are identical with those of childhood on the one hand, and with the wishes behind the neuroses on the other. The invert and pervert, regressing to a certain point of fixation of their libido, accept the call to the past without any conflict or compunction.

Evidently there must be a definite factor which decides whether there should or should not be a repression, or in other words whether there should be a neurosis or a perversion.

IX.

What is this factor? It is that something in the individual which is generally termed the "I," the ego. It is that part of the personality which is derived from the instinct of selfpreservation, as distinct from the instinct of sex or race preservation. Whereas the sex impulse brings in its wake the premium of pleasuse, the ego instinct's aim is survival. That is why the ego is the seat of reality and expediency, faculties which are coordinated by points of correspondence in the outside world. It is also the centre of logic, judgment, and conscience. Quite the contrary to the unconscious it is guided by the categories of time and space. Through these means it masters environment, erects standards for itself and aims for an adjustment in life, which would enable it to live on in accordance with these standards. In short, it is the organized differentiated self love.

The ego not unlike the sexuality does not arise spontaneously. It is the product of growth and development. Its beginning is present at the very birth. In that primitive state it is entirely selfsufficient and is fused with the primitive sex impulse together constituting autoerotism. As it develops it gradually differentiates itself from its partner. What was at the beginning autoerotism eventually becomes on the one hand the ego, and on the other the libido.

In the exercise of the ego instinct there is, however, always the pleasure and joy which are the remnants of the original autoerotism. In other words the ego retains a good deal of the libido.

The energy of the libido attached to the ego becomes thus available for the building up and maintenance of the high order of organization of the ego. But no matter how high is its development it always retains the original quality of selfsufficiency or self love, termed narcissism. The tendencies of the personality which are directed to the furthering of the ego are therefore spoken of as narcissistic, which conveys the meaning that the libidinous energy of these tendencies is bound up with the ego.

From the original state there is always carried over into the later ego a bit of the primitive selflove, selfadmiration and selfperfection, in the form of an ego ideal, which every person has. The ego ideal together with the functions of conscience, reality, sense of judgment, etc., are termed collectively the ideal ego, thereby suggesting that there are still undifferentiated portions of the ego.

It is this ideal ego which acts as the inhibitor of the sex impulses. In proportion as it checks them and taps their energy for the purpose of its own organization, it grows in importance and comes to occupy the exalted position of being the index of the whole personality, at least for the subject himself. The more free play the sexual impulses have the more primitive is the ego, and vice versa. The degree of self love is in inverse ratio to the degree of love devoted to sexual aims. The quantitative factor, the libido, is transmutable between the two phases of the organism: Ego and sexuality.

However, there is a limitation of the quantity of the libido that the ego may attract onto itself. Beyond a certain limit there results its psychopathic hypertrophy, clinically manifested as egomania. The safer way of checking the sexual strivings is by diverting their energy into a channel which leads to an aim other than sexual gratification, in other words to more acceptable forms of gratification. This disengagement of the sexual impulses from the sexual aim is designated sublimation. The results of this process are all the social service functions, scientific interest, religious and artistic pursuits. The whole range of social living is an expression of its working. The ego permits the sexual impulse to come to the fore provided the form of its manifestation would further the ego.

Now in the instance of the neurosis the number of sublimation outlets for the available libido is inadequate. It therefore reenergizes abandoned channels. As such these channels are not acceptable to the ego, and repression results. What emerges from the repression is essentially the same as in sublimation, namely, the sex striving is robbed of its sexual aim. In this sense the whole of civilization is the product of the process of repression, and is expressive of the balance between impulses which are approved by the ego, and those which are rejected.

Our consideration of the psychology of the ego has taken us somewhat afield. But some apprehension of its elements is essential for the understanding of the genesis of a neurosis.

We must thus add two more important etiological factors to our list, namely, a fairly high level of the ego, and an inadequacy of sublimation for the given quantity of the available libido.

Unfortunately the subject of etiology of the neuroses is much more complex than one would have desired it to be. There is still one more etiological factor, which must be borne in mind, namely, the constitution of the patient.

In the clinical material obtained from the patient time and again one meets cases in which the infantile experience of exercising a partial sex impulse was clearly not excessive. In other words, the infantile trauma was mild. And yet there came about a point of fixation. This peculiarity is explicable only on the basis of heredity.

It is the hereditary factor plus the infantile experience which converge to bring about the point of fixation. These two factors, heredity and accident, vary in each individual case of fixation. In some one, in some the other predominates. The combination of the two is spoken of as the disposition to neuroses.

We have thus arrived at the point where the etiological problem lends itself to a formulation as suggested by Freud. Heredity plus infantile experience constitute the disposition. Disposition plus external difficulty of later life eventuates in neurosis.

In summarizing our discussion up to this point we would say: 1. The neurosis is essentially a repetition of infantile situations. Much of this repetition is betrayed even to a superficial examination of the patient. 2. The seat of the pathological process is in the sexual sphere. 3. The disease is precipitated by an external factor in adult life, inducing a withdrawal from reality into the world of phantasy. 4. This unconscious phantasy is an expression of a regression to an early point of psychosexual development. 5. This particular point of development, termed fixation of the libido, is the resultant of two factors—infantile traumatic experience, and heredity, which constitutes the predisposition. 6. Regression to a point of fixation does not cover the problem of genesis of the neurosis. The phase of the personality termed ego which induces the repression plays an important rôle.

Generally speaking, the neurosis is the result of the mode of distribution of the libido. It depends upon how much the libido is withdrawn from the external world, what point of fixation it regresses to, and how much libido there is in the ego.

In the light of these considerations one finds a criterion for the classification and for the therapeutic approach to the neuroses, which is the topic of the next lecture.

91 Park Avenue.

Clinical Significance of the Eosinophilic Cells of the Blood

By A. J. HINKLEMAN, M.D.,
Oklahoma City, Oklahoma.

The eosinophilic cell of the blood, while probably the most important of all the white cells present, owing to the difficulty of obtaining accurate data regarding any of those cells which are usually present only in small numbers, the clinical significance of the eosinophiles has never been fully determined.

Through a careful study of the numerical relationship of the white cells of the blood, by hematinometric means, (1) where absolute accuracy is assured, and by which the differential count is readily made upon a basis of from 3000 to 8000 cells, I have become convinced that the eosinophiles are never normally present in the blood, in the same sense that the lymphocytes and the polymorphonuclear leucocytes are. But they are always in evidence either during disease or unusual activity of certain tissues of the body, or during the direct action upon the blood making organs of certain toxines, poisons or substances that are within themselves chemotactic for this particular cell.

Among more than three thousand differential counts I found no regularity in the presence of the eosinophiles that in any sense could be interpreted as a normal count. I found that the absolute number to the c. mm. of the socalled normal persons vary according to surrounding circumstances.

In the ordinary diseases and inflammatory processes, those tissues or organs that have a direct and open connection with the circulation, and in which infection threatens life, do not liberate positive chemotactic elements, when affected, that act upon the blood making organs to stimulate increased production of the eosinophilic cells. The eosinophiles, at the same time, are attracted to the inflamed area as much as the other granular cells are; as a consequence of which the tendency is to take the eosinophiles entirely out of the circulation.

On the other hand, those tissues or organs of the body in which the route to the circulation is less direct and open, and in which diseases and inflammations are always more passive and never directly threaten the patient's life, do liberate positive chemotactic elements, that stimulate the blood making organs to an increased production of the eosinophiles, while there is a correspondingly increased demand. As a consequence of this process, the usual eosinophile count for the person remains unaffected or may be increased. A classification of the tissues and organs in this respect may be made as follows:

Eosinophilic Positive	*Eosinophilic Negative*
Skin	Appendix
Subcutaneous tissues	Intestinal tract
Muscles	Peritoneum
Bones	Pericardium
Urethra	Uterine cavity
Bladder	Liver
Kidneys	Endocardium
Ovaries	Pleura
Fallopian tubes	Gallbladder
Prostate gland	Respiratory tract

In uncomplicated diseases and inflammations of the eosinophilic positive tissues, the eosinophiles of the blood will invariably be found to constitute from 0.5 per cent. to seven per cent. of the total white count, while in uncomplicated diseases of the eosinophilic negative tissues, they seldom reach 0.1 per cent. of the total count.

In the case of acute appendicitis, peritonitis and any other of those severe infections that may readily end fatal the eosinophiles are usually found entirely absent among three thousand cells, while in uncomplicated cases of pelvic infection involving either the ovaries or fallopian tubes, they are invariably present among this number of cells and may constitute as high as seven per cent. of the count.

In such conditions as furunculosis, rheumatism, trichinosis, osteomyelitis, gonorrhea, cystitis, renal calculus and diseases of the prostate gland, the eosinophiles are always strikingly present. In the case of syphilis, sarcoma and carcinomatous conditions, the presence or absence of the eosinophiles from the circulation depends upon the tissues envolved.

EOSINOPHILIC POSITIVE TOXINES.

The foregoing refers simply to the manner in which the eosinophiles are affected by the products originating in inflamed or diseased tissues regardless of the cause. Certain elements, however, in the etiology of diseases, such as the products of certain intestinal parasites, the tubercle bacillus and whatever the toxin or poison concerned in bronchial asthma is, are of course, eosinophilic positive within themselves and produce an increase of the eosinophiles regardless of source in cases of this class the increase is usually distinctly pronounced.

CONCLUSION.

1. The eosinophilic cells of the blood are present as a result of the action of extrinsic forces upon certain tissues that liberate eosinophilic positive chemotactic elements into the circulation, or as a result of direct action upon the blood making organs of eosinophilic positive, chemotactic elements contained in bacteria, parasites and unknown toxins or poisons.
2. Those tissues or organs of the body in which the route to the circulation is direct and open, and in which infection may readily prove fatal, constitute the eosinophilic negative tissues.
3. Those tissues or organs, on the other hand, in which the route to the circulation is less direct and open, and in which an infection is less likely to prove fatal, constitute the eosinophilic positive tissues.
4. Eosinophilic positive chemotactic elements in the way of products from bacteria, parasites and unknown toxines and poisons produce a rise of the eosinophile cells of the blood regardless of source.

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312 Shops Building.

The Influence of the Local Blood Supply on Crisis and Lysis in Pneumonia*

By GEORGE G. ORNSTEIN, M.D.,
and A. BRAUNSTEIN, M.D.,
New. York.

From the vast accumulation of literature one can readily see that there is no more interesting problem for investigation among the acute infectious diseases than acute lobar pneumonia. What has particularly attracted the attention of clinicians, and in spite of the great amount of investigation, remains unsatisfactorily solved, is that remarkable phenomenon called the crisis. The interesting and practicable question to determine is the nature of the changes occurring in the balance between the invading organism and the invaded host. The abrupt and radical changes that occur in the condition of the patient from a state of extreme hazard and distress to one of safety and comfort indicate that some profound change must have taken place in this balance. To describe the actual nature of the changes taking place at this time is the purpose of this paper.

PATHOLOGY.

Inasmuch as the stereotyped textbook description of the pathology of the pneumonic lung in its three stages is known, we feel quite justified in omitting this phase of the subject. We believe, however, that the factor of prime importance is the pathology occurring in the circulatory portion of the affected area, the changes occurring in the alveolar structures themselves being actually of only secondary importance. Osler, Adami and McCrae, and Delafield and Prudden state that in the stages of congestion and red hepatization, however, the circulation in the capillaries may be interfered with by the hyperemia, and by the compression of these capillaries due to the alveolar exudate and contents, the vessels are still pervious to the circulation of blood. On the other hand, in our opinion, the all important circulatory change occurs in the transition to the stage of gray hepatization.

Kline and Winternitz (1), in 1913, in their attempt to discover the fate of polymorphonuclear leucocytes, took up the study of changes in the circulation in pneumonic areas. Before discussing the results of their work, it may be well to review the previous and prevalent opinions of the changes occurring when red hepatization becomes gray hepatization. The anemic appearance of the latter has been attributed to various causes. The oftmentioned change is the loss of the red blood corpuscles in the alveoli where it is true they are many in number and well preserved in the red stage, both in outline and in their hemoglobin content, whereas in the gray stage they are scarcely to be seen. Again, in the latter picture, there is visible a recent marked infiltration with, and packing by, polymorphonuclear leucocytes, their number and compactness in the alveoli being the factor held to give the grayish color to this stage. Aufrecht (2) says that the exclusive cause of this transition was the substitution of white for red blood cells. The conclusion was soon widely accepted that the progressive pallor after engorgement and red hepatization was produced by the ever increasing number of leucocytes in the exudate, and partly by the compression of the walls of the capillaries by the ever increasing exudate.

Kline and Winternitz, in their experiments, employed rabbits and the lungs at autopsy of human beings dead of pneumonia. Having injected a normal rabbit intravenously with trypan blue and then infecting it with virulent cultures of pneumococci, upon killing the animals, they found both lungs uniformly stained with the dye. They then first infected rabbits with similar cultures of pneumococci, and on injecting the dye after such infection found that that part of the pneumonic area, that had failed to take up the dye, was readily demarcated from the remaining normal portions of the lungs in the gross, and failed microscopically to show any proportionate staining. By injecting human pneumonic lungs at autopsy by the pulmonary vessels, and employing the same dyes, they found that again the dyes had failed to penetrate the consolidated areas, the normal areas having uniformly taken up the blue color. On section, all such nonstained areas were found to contain capillaries that were plugged with fibrin and thrombi. To show that the impenetrability of the dye was not due to intraalveolar pressure produced by the exudate present, one lung of a rabbit was distended with air, by means of a catheter in a bronchus, under a pressure of 120 mm. of mercury, and injection of both lungs by the vessels with the dye gave uniform staining and coloration throughout both lungs. In other rabbits, after the administration of phosphorus and chloroform to decrease the ability of the blood to deposit its fibrin, the animals were infected with pneumococci. The dye was then injected intravenously. Here the lungs were again uniformly dyed, as well as the pneumonic areas. The conclusion was then apparent to these workers that fibrin thrombi in the capillaries of the consolidated areas were responsible for the obstruction to the circulation. The conclusion is therefore also certain that, in the transition from red to gray hepatization, the marked and constant causative factor is this impairment to local circulation, the blood stream no longer being able with its serum to carry in dyes into the consolidated lung tissue. Other workers, Ribbert (3) and Pratt (4) have taken note of these thrombi in the capillaries, but they interpreted them as being possibly due to agonal or postmortem changes.

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*From the Vanderbilt Clinic, College of Physicians and Surgeons, Columbia University, New York.

With regard to the lymphatics in these areas, Pratt has stated that in the stage of gray hepatization there is occlusion of their lumina by a proliferation of the endothelial cells, the vessels becoming distended with cells, serum, and fibrin.

TOXEMIA.

The nature of the substances produced by the growth of the pneumococcus has for many years caused wide discussion and much speculation. The oldest theory, and probably the one most adhered to of recent years, has been Pfeiffer's endotoxin theory, which presupposes that the bacterial cell bodies first undergo a dissolution, such proteolysis setting free various poisonous protein fractions which cause the toxemia of the disease. Rosenow, Neufeld and Dold, Cole (5), and others were able to produce symptoms analogous to anaphylactic shock in animals by the use of cultures of pneumococci digested in sodium cholate and by the autolyzed bodies of pneumococci in salt solution. The use of such autolyzed preparations sometimes gave pictures of anaphylactic shock, but at other times the effects are very slight. On the basis of dissolution of the bacterial cell bodies as the cause of symptoms in pneumonia, it would be natural to expect that, following the crisis, there ought to be an aggravated clinical picture, since at this time resolution of the pneumonic area causes widespread dissolution of the bacteria present as well as of the exudate. We know such an aggravation of the clinical picture does not occur. Anaphylaxis and its production are not the usual causative factors in the toxemia. Using digested masses of any bacterium will produce the picture of shock, the explanation then being that of primary protein sensitization and secondary anaphylaxis.

Douchez and Avery (6) attempting to find a more plausible explanation for the manifestations in pneumonia, were able to demonstrate in 1917, that young fresh cultures of pneumococci produced, during their early growth, a soluble substance which could be precipitated by homologous immune serum. This same substance was soon demonstrated by them in the blood stream and urine of experimentally infected animals, and then in humans suffering from pneumonia. This substance soluble in salt solution could not, in the fresh cultures, have been derived from old autolyzed dead bacteria since fresh young cultures were used. It could not have been produced by dissolution of cell bodies in the new growths since the substance was isolated during the first twenty-four hours of growth. During this time the growth therefore in the medium was in direct geometric proportion, by actual count, with very little or no cell death.

Though this work does not definitely prove that this soluble substance is the actual cause of the pneumonic toxemia, it brings us a step further toward considering a soluble toxin as the factor in the symptomatology.

The authors feel that they can rule out the dissolution theory as the possible cause of the toxemia. This can be assumed when we realize that during the stage of resolution, as mentioned, there is the greatest absorption of the products of digestion of the pneumococci. If the toxemia were due to absorption of such products, we ought to expect symptoms at this period. Inasmuch as there is toxemia during the period that the pneumonic area is vascular (stages of congestion and red hepatization) it may be assumed that the substances causing the toxemia are soluble and are absorbed into the circulation.

Bearing in mind the changes in the circulation as outlined, and the possibility of a soluble toxin causing the toxemia, we undertook the study of a series of protocols on autopsies of cases of pneumonia. If the pathology of the circulation was correct, gray hepatization should always be found accompanied by either of the stages of congestion or red hepatization at autopsy. In other words, if the latter two stages terminated in gray hepatization, the patient should have recovered in the absence of another lethal factor. Death supervenes only while some portion of either lung reveals either of the stages of congestion or red hepatization. If the original area has become gray, it will always be found that another area, or other areas, have become freshly involved.

Through the courtesy of Dr. Douglas Symmers, director of the Bellevue Hospital Pathological Laboratories, who kindly placed the protocols of the hospital at our disposal, we are able to report the findings in eighty-seven autopsies of lobar pneumonia.

Selection of cases was made with certain restrictions in mind. The cases selected were those of lobar pneumonia in which it was the sole cause of death so far as we are able to determine. No cases of bronchopneumonia were tabulated in our series. Cases of lobar pneumonia with marked hydrothorax were omitted, as well as frank cases where there were found at autopsy other conditions lethal in themselves, such as coronary atherosis, empyema, a complicating pneumococcic meningitis, and so forth.*

1. Of eighty-seven autopsies of lobar pneumonia, there were thirteen in which an area of congestion was found, or sixteen per cent.

2. There were seventy-two in which an area of red hepatization was found, or eighty-three per cent.

3. There were eighty-five in which an area of either congestion or red hepatization was found, or 97.7 per cent.

4. There were two cases in which the stage of gray hepatization occurred, or 2.3 per cent.

In the cases with gray hepatization, one entire lung was thus involved in each case. It is therefore possible that areas of congestion or red hepatization may have been present but not noted in the protocol because of the preponderating lesion on one side.

SYMPTOMATOLOGY.

As in any other disease, the symptomatology in pneumonia has been attributed to a profound toxemia. The symptomatology of pneumonia is well known to us all. Our object in this paper will be to discuss only the sudden onset and sudden cessation of symptoms in the light of the above pathology. From the onset of the disease the temperature is marked by a sudden rise to its maximum, and continues at that level with more or less variation. This state continues for a number of days when it may abruptly fall. This fall of temperature, with its cessation of all discomfort, is called the crisis. This phenomenon has been the subject of much discussion. It has been generally agreed that the crisis in pneumonia is produced by a sudden increase in the defenses of the body. The immunity to pneumonia in man, it has also been agreed, is slight at best and only of short duration. The only antibodies demonstable are those of the secondary order—bacteriotropins, which alter the bacteria so as to be more easily susceptible to phagocytes; and those antibodies, agglutinins and precipitins, which are of diagnostic value only. The work of many experimenters, especially that of Neufeld, could not prove that bacteriotropins act. Rosenow (7) found a low opsonic index at the start with a slight rise at the crisis. Clough (8), discussing the results of this work, believed its significance questionable even if true. Certainly in the face of the indecisive results of the above researches and those of other workers, the mechanism of the crisis cannot be entirely explained on the basis of an immunological reaction.

Immediately following the crisis there is a comparatively sudden fall in the various manifestations of the disease, temperature, pulse, and respirations falling to normal, with a marked change from discomfort to comfort and refreshing sleep. How can such a sudden alteration in the picture occur? It can occur only with a subsequent discontinuation of absorption of the substances causing the toxemia. Moreover, such a discontinuance can be explained in only one way—a mechanical interference with the circulation in the pneumonic area. This is brought about by the formation of fibrinous plugs and thrombi in the bloodvessels in the involved area, making this area avascular.

RESOLUTION.

The exudate in pneumonic lung tissue has been shown to be proteolytic, even though sterile of pneumococci, and hence contains a ferment which has been called trypsin (9). Such proteolytic action can be controlled if serum is added to the exudate and the substance to be digested. The blood serum, it has been concluded, contains a controlling ferment, antitrypsin. In the avascular period resolution proceeds. There is digestion of the exudate and of the alveolar contents including the pneumococci; and this process, it has been shown, takes place only when the disturbance in the trypsin-antitrypsin balance is such that it gives the trypsin a free hand. The serum with its antitrypsin is almost entirely absent from the pneumonic area during early resolution, and such an absence can occur only when the circulation is shut off in that area. Enough seepage of serum occurs, however, to prevent destruction of the alveolar walls. With the complete absence of serum, local necrosis takes place. With the free access of serum, that is, with an insufficient interference of the circulation, delayed resolution is the result. As resolution proceeds the thrombi and fibrinous plugs in the vessels are also attacked by the trypsin, and the circulation is gradually reestablished.

SUMMARY.

Crisis is the result of a mechanical interference with the circulation in the pneumonia area, brought about by the formation of fibrinous plugs and thrombi in the bloodvessels in the involved area. With the cessation of circulation, absorption of toxic substances from the pneumonic area ceases and the phenomenon termed crisis occurs. Lysis is a more gradual mechanical interference with the circulation in the pneumonic area.

Symptoms are manifest from the time of the inception of the disease until the pneumonic area becomes avascular.

The toxemia is probably caused by a soluble substance absorbed into the circulation.

The termination of a pneumonic process is not only caused by an immunological but also by a mechanical phenomenon.

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136 West Seventy-fifth Street.

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*Owing to lack of space it was necessary to omit the authors' charts.

Etiology and Pathogenesis of Anal Pruritus and Pruritus Ani*

By J. F. MONTAGUE, M.D.,
New York,
Rectal Clinic at University and Bellevue Hospital Medical College.

Disregarding for the time being the question of whether we are dealing with a symptom or a disease and proceeding under the assumption that this condition is an actuality and not merely an hallucination existing only in the patient's mind, we find, upon consideration, that we are dealing with a certain sensation of irritation which is projected in consciousness to a definite area of the body. This area consists of the terminal three quarter inch of the anal canal, the mucocutaneous margin and an elliptical area of perianal skin which extends two and three quarter inches anteriorly and posteriorly from the centre of the anal orifice and two inches laterally on both sides from the same point. This is the area in which or throughout which the conditions under discussion play havoc and inasmuch as the symptoms are clinically uniform throughout this zone I am going to refer to it, for the sake of convenience, as the pruritic zone.

We have then a sensation of irritation projected in consciousness to the pruritic zone, which area is supplied by the first four sacral segments of the spinal cord. If then we admit, as we must in view of the invalidity of the psychic theory, that it is the conscious appreciation of an irritation we must find the source of such stimulation and consequent irritation. Needless to say, the territory which we must survey extends over the entire nervous system.

Knowing that according to Müller's law of the specific energy of the senses, that no kind of sensation can be produced by external causes which cannot be equally excited in the absence of external causes by intrinsic changes in the nerves, we must look with critical eye not only upon the perceptual apparatus of the nervous system, by means of which changes in the external world are translated from stimuli into appropriate nerve impulses, but we must also scan the conducting apparatus as being capable under certain conditions of giving rise to like impressions. Thus pruritus, being a sensation, may actually be perceived in consciousness by appropriate changes within the nerve channels without regard to stimuli received at the perceptual end organs and this is actually noticed in those cases without evident local pathology. Within the sense of the above quoted law the sensation may arise from stimulation at any susceptible focus in the nervous pathway from the periphery to the cerebral cortex.

Where are these points of susceptibility to stimulation and consequent irritation? The presence of the myelin sheath around the conducting nerve fibres precludes the probabilities of stimulation along these pathways and narrows the probabilities to three points, namely, the peripheral end organs or amyelinated fibres immediately proximal thereto, the synaptic junctions or proximities in the posterior spinal ganglion or the lateral horn of the spinal cord or, lastly, in the cortical cells of the brain.

CLASSIFICATION.

The discussion thus far has brought me to a point where, admitting that a real sensation is evoked, I must needs classify the causes which evoke it. I am quite conscious of the fact that the usual classification of such causes is into constitutional, reflex and local —but since it is my object to make this a complete analysis the analytical process must be pursued until a fundamental basis is struck from which a theory can be formulated.

The most fundamental and the most useful classification which presents itself to my mind is that of: 1. Direct pruritus, and, 2, indirect pruritus.

Under the heading of direct pruritus we can, with good logic, place all those various causes which affect their stimulation by direct action upon the peripheral nerve endings in the pruritic zone. The action may be on or in the skin of this zone and still be a direct pruritus.

The group of causes which I am including under the generic term of indirect pruritus includes all those causes which have hitherto been called constitutional or reflex. To both these terms I have strong objection on the ground that they are neither descriptive nor accurate. Hence, as misleading appellations they should be abolished.

To substantiate this suggestion and to refute any possible counter argument on the part of those who are well satisfied with those terms I will immediately submit my own views on direct and indirect pruritus. At a little later point I will explain on the basis of my own theory the relation these conditions have to pruritus ani and anal pruritus.

To set forth in greater detail exactly what I mean by the term direct pruritus I would state that in all those cases in which traumatism of the peripheral nerve endings occurs by virtue of abrasion, avulsion, compression, physical or chemical maceration of the epidermis and its therein contained peripheral end organs and the amyelinated nerve fibres immediately proximal thereto, direct pruritus occurs. In other words, such processes are, in my opinion, sufficient to cause the generation of afferent stimuli of greater intensity than those causing normal tactile sensations and that these abnormally intense afferent stimuli are perceived in consciousness as irritation.

The peripheral location of the causative agent in direct pruritus can be demonstrated by the complete removal of the pruritus by the infiltration of the epidermis in this region with local anesthetics or by operative procedure such as sacral nerve blocking or superficial neurotomy.

As to indirect pruritus innumerable clinical observations and the bulk of medical literature will support the statements that I am about to make. I quote no authorities, for the reason that these observations have been made and reported by so many investigators that it is needless.

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*Read before the Twenty-third Annual Meeting of the American Proctologic Society, St. Louis, Mo., May 22 and 23, 1922.

In many of those chronic diseases of the stomach associated with dyspepsia, which will be termed chronic gastritis, there is added to the clinical picture the condition known as pruritus of the anus. This is particularly true in cases associated with much gastric fermentation. In these cases a cure or relief of the gastric condition often brings about a parallel relief in the pruritus. Medical literature reports the association in some cases of carcinoma of the stomach with pruritus and many other chronic diseases of the gastrointestinal tract such as chronic colitis, chronic constipation, fecal retention, and so forth, have also been observed to have an apparent relation with the causation of pruritus ani or anal pruritus.

In a closely similar manner an identical apparent relation has been seen to exist in some cases with chronic diseases of the genitourinary tract. As examples of this chronic endometritis, chronic prostatitis, hypertrophied prostate and chronic urethritis may be mentioned.

Of the other chronic visceral diseases which at times appear to bear a relation to this condition, obstructive derangements of the liver such as hypertrophic cirrhosis of the liver are notable instances. Chronic cholecystitis, chronic nephritis, cystic calculus and neoplastic growths of the liver have each contributed their share of examples of this relation to pruritus ani and anal pruritus. Other instances might be furnished, but these are sufficient at present for our purpose.

HYPOTHESIS.

Bearing in mind the observations above mentioned, it will be noted that the general factors involved are that chronic visceral diseases are very frequently associated with pruritus ani and anal pruritus. These chronic visceral diseases are those that are associated in most cases with chronic inflammation and in almost all cases with a departure in size from the normal either by virtue of hypertrophy, hyperplasia, congestion or distention. Knowing that each of these viscera is supplied with a network of nerve fibres which are particularly abundant in the capsule, it is logical to assume that a departure from the normal size of such organ would cause the generation of afferent nervous stimuli. Those diseases which Osler states as having pruritus as a concurrent condition are diabetes, Hodgkin's disease, lymphoid leucemia, and exophthalmic goitre. All of these diseases, it will be noted, involve a departure in size of the viscera they affect.

It is my firm belief that whenever a viscus is the seat of chronic inflammation, congestion, hyperplasia, hypertrophy, distention or dilatation a stream of afferent stimuli are generated by the mechanical tension on the neural arborizations terminating in its capsule and such stimuli are transmitted by the afferent visceral nerves to the central nervous system.

The viscera, however, are supplied by fibres of the autonomic nervous system and these fibres are not able to convey pain. Langley, Dogiel, and Ranson have, however, proved that the afferent nerves from these viscera come into synaptic relation with the somatic afferents in the ganglia of the posterior nerve root and also in the lateral horn of the spinal cord.

It seems plausible, therefore, to assume that these abnormal afferent impulses from the viscera lead to the stimulation of somatic afferents by creating an irritable focus in the posterior spinal ganglion and that the function of sensation being more commonly utilized in reference to the somatic afferents the irritant stimulus is referred in consciousness, not to its true source but to the place from which such stimuli are habitually received and hence the irritation is referred to the skin of the area supplied by the particular somatic afferent nerve affected. This is a transference of sensation which is exactly analogous in principle with the misreference of pain but that it is not a reflex must be evident from an examination of the anatomical facts.

Now in applying this hypothesis to the particular instance of pruritus ani and anal pruritus attention is drawn to the following facts of anatomical structure: The pruritic zone is supplied by sensory nerves which have their origin in the first four sacral segments. These same segments are in intimate neural connection with not only the pelvic viscera but also with the other abdominal viscera. It will be remembered that the third along with the second or fourth sacral nerve in addition to receiving gray rami communicantes with the sacral autonomics sends a large white ramus communicans or visceral branch direct to the pelvic plexus and viscera. The intimate connections between the various plexuses, the hypogastric plexus and the aortic plexuses bring the superior and inferior mesenteric plexuses into close relation with these sacral segments.

The afferent nerves from the viscera have long been assumed, first by Dogiel and later by others to end their travel centripetally by coming into synaptic relation with the cells of the posterior spinal ganglion by means of the white ramus communications or, by means of the same channel, they may pass through the posterior spinal ganglion and end in the lateral horn of the spinal cord in synaptic relation with the commissural cells of the intermediolateral tract at that level or some higher or lower level. The sympathetic neurons in contradistinction to those of the central nervous system have been shown to come into multiple relations with the various segments. It is thus readily seen that this transference of sensation may come in segments apparently removed from the source of afferent visceral stimuli.

Clinical observation of the frequent association of visceral disease can thus be linked in a logical manner with this manifestation of transference of afferent stimuli and their consequent misreference of localization. This phenomenon is evidenced clinically as pruritus of the anus of the indirect type.

The fact that it is an indirect pruritus is clearly demonstrable by its continued existence after the tissue of the pruritic zone has been thoroughly infiltrated with local anesthetic, after sacral nerve blocking or after superficial neurotomy.

In answer to the question which probably presents itself to your mind as to why such a transference of sensation is not evidenced as pain it must be recalled that pain, like other sensations, has a definite threshold. If we assume that the irritative stimulus which produces the transferred impulse causing the sensation of pruritus is below that threshold and hence incapable of producing the sensation of pain we can readily conceive how it is appreciated in consciousness as an irritation to which we have given the name of itching or pruritus. As a matter of clinical fact these cases of pruritus will frequently tell you that at some times the pruritus becomes so intense that it actually does pain them and in such cases I assume that the threshold of pain has been crossed.

TO RECAPITULATE.

I believe that all cases of pruritus of the anus can be clinically divided into two classes: The one a direct pruritus of the anus, due to the direct irritation of the peripheral nerve endings in the pruritic zone and in which cases the source of irritation actually causes a primary pathology and whose direct nature can be demonstrated by the abolition of pruritic sensation by local anesthetization or superficial neurotomy.

The other an indirect pruritus of the anus, due to the perception of the pruritic sensation which in consciousness is referred to the pruritic zone, an area which is at the inception of the pruritus devoid of any pathological condition at all. This phenomenon is due to the transference of an irritable stimulus from the visceral afferent nerves to a normal somatic afferent nerve channel or pathway and the consequent misreference or error in localization of the sensation.

This indirect pruritus although devoid of any local pathological condition at its inception induces a desire to scratch which results in the pathological changes previously noted, namely, first, a traumatic, chronic dermatitis and in many cases secondly an infective chronic dermatitis. These secondary pathological changes in the tissues of the pruritic zone lead to an added component of direct pruritus of the anus. As a matter of clinical fact sooner or later in all these cases of indirect pruritus of the anus there is superimposed the element of direct pruritus of anus.

Indirect pruritus of the anus may be demonstrated to be an indirect pruritus by the lack of abolition of the pruritus by local anesthetization, nerve blocking or neurotomy and by the discovery of a source of visceral abnormal afferent stimuli. Owing to the addition in most cases of an element of direct pruritus there may be effected, by the methods above mentioned, an apparent decrease in the intensity of the pruritus or by virtue of counterirritation a temporary total relief. The indirect component of the pruritus, however, returns quite soon and from then on is constant in its intensity.

CLASSIFICATIONS OTHER THAN THE FOREGOING.

That this phenomenon of indirect pruritus is not a reflex condition must be selfevident in view of the foregoing so will not be further mentioned. It is a misnomer and should be omitted in describing indirect pruritus.

In regard to the socalled constitutional causes of pruritus of the anus one has but to consider the pathology of those diseases to which it is commonly ascribed to see that the associated pruritus comes under the classification of either indirect or direct pruritus.

Consider, for example, that diseases to which it is commonly attributed, namely, diabetes mellitus. Its mode of action in these cases is presumed to be due to the irritant action of the diabetic urine upon the skin of the pruritic zone. That this is not the case was proven by the experiments of Veit which I have duplicated for my own satisfaction. They consist in the application of pads saturated with solutions in normal urine of glucose of a strength varying from one tenth per cent. to four tenths per cent. over the perianal region for a period of two to three weeks. No pruritus of the anus develops. If the condition be due to the excess of blood sugar throughout the body circulation one would expect a generalized pruritus and not a distinctly localized affair such as this condition is. When we consider, however, that in these cases of diabetes mellitus the liver is usually considerably enlarged; that dilatation of the stomach is common; that a diffuse nephritis is often present and that the constant lesion of the disease is a chronic interstitial pancreatitis (with degeneration of the islands of Langerhans in some cases), when we consider all of the preceding pathological data—we can readily conceive the generation of enough afferent, abnormal stimuli to cause indirect pruritus. It is also noteworthy that peripheral neuritis when occurring in diabetes usually affects the third sacral nerve.

Similar in manner to the ease with which the pruritus of the anus associated with diabetes mellitus can be definitely classified as an indirect pruritus of the anus, so, too, can the remainder of causes hitherto classified as constitutional be assigned to either one or the other of the types that I have previously suggested, namely, direct or indirect pruritus. To explain in detail how jaundice, gout and rheumatism or other constitutional diseases which have been mentioned in past literature as being causes of pruritus ani fit into the classification I have made would require more time than can be allotted at this moment, so it must perforce be reserved for some future discussion.

Of the various theories of etiology the same may be said but, in passing, I will say that the general indictment of being secondary and not primary in significance may with good logic be brought against the majority of such theories, as, for example, that it is due to a fibrosis of the nerve endings, that it is due to the deposition of an inflammatory exudate in the skin or that it is due to a definite dermal infection.

DISEASE OR SYMPTOM?

Coming now to the inevitable question: Is this condition a symptom or a disease? From time immemorial opinion has been divided as to whether this condition is a disease or merely the symptom of a disease.

This is quite natural inasmuch as we have had no standardized and generally accepted conception as to its exact nature. Nor is general medical opinion definitely formed as to what constitutes a disease and what constitutes a predominant symptom of a disease, the term disease often being figuratively and inaccurately applied.

With this discrepancy on the one hand in the conception of the nature of the matter in question and on the other hand the lack of a fairly defined standard by which to measure it, it is not surprising that opinions should be so diverse. Thus, those who believed in one theory of pathogenesis were inclined to mitigate its importance and pronounce it a symptom while those adhering to another view elevated it to the plane of a distinct clinical entity.

A consensus of definitions given by dictionaries and encyclopedias now in vogue with the medical profession gives us the following: The word disease is the speech equivalent for a departure, general or local, from the normal structural or functional status of a vital organism. The word symptom represents a circumstance coincident with a disease whose nature, character and location it serves to indicate.

In regard to the question that still remains: Is this condition a disease per se or is it a symptom among others?

Measuring the condition as we know it by the standards set forth in the above definitions we come to the following conclusions:

That the direct form of pruritus of the anus is in itself a clinical entity cannot be denied. The fissure caused by the passage of a hard, constipated stool or the maceration of epidermis by the acrid secretion of fistulæ may be a definite etiological factor in the resulting disease, but the process from then on is a distinct clinical entity with its own pathology and symptoms. That such conditions as constipation or fistulæ contribute, by furnishing the inciting agent, in no way invalidates the statement that the condition is per se a distinct entity any more than the fact that autointoxication is instrumental in the production of arteriosclerosis makes this condition a component of the former instead of an individual clinical entity.

In regard, however, to the other form of pruritus of the anus which I have referred to previously as indirect pruritus we are confronted with the fact that there is no primary local pathological condition, that the pathological condition found is of a secondary nature and that the pruritus exists before the pathological condition develops. It is, then, merely a subjective manifestation of another clinical entity and merely attains and maintains its prominence as a symptom because of the fact that the primary cause is not removed. However, as has been noted, these cases of indirect pruritus sooner or later have added to them the component of direct pruritus and under these circumstances we have direct pruritus, the disease, concomitant with indirect pruritus, the symptom.

NOMENCLATURE.

As a suggestion, recognizing the value of using terms with which we are familiar and which have acquired the weight of long usage, I would suggest that we term direct pruritus as pruritus ani and that we reserve the term anal pruritus for the form known as indirect pruritus.

Thus an adaptation of existing terms is accomplished which, without coining any new terms, has the advantage of specifying the clinical nature of the condition in question.

540 PARK AVENUE.

Fracture of the Head and Neck of the Radius

By JACOB GROSSMAN, M.D.,
New York
Chief of the Orthopedic Clinic, Lebanon Hospital.

Fracture of the head and neck of the radius occurs more commonly than was formerly believed. The head and neck are prone to fracture on account of their exposed subcutaneous position. They are readily palpable and can be felt rotating at the radiohumeral joint. The fracture is usually the result of a direct injury and occasionally may result from an indirect injury, such for instance as where a patient while falling attempts to save himself from injury by stretching out his hand. When the patient falls, striking the outer side of the elbow, the head of the radius is compressed between the ground and the coronoid process at the lesser sigmoid cavity, with the result that a portion of the head is cracked off. Occasionally a stellate fracture may result. The external epicondyle of the humerus may also be the site of a chipping fracture. When the fracture results from indirect violence the head of the radius is jammed against the capitellum.

The chief sign of this type of fracture is a so-called wincing tenderness, elicited by direct pressure upon the head or neck of the radius. Pain may also be produced by pronating and supinating the forearm. There may be swelling in the region of the radiohumeral joint, due to effusion from a traumatic synovitis. The swelling may also be due in part to hemorrhage into the joint. Ecchymosis may appear late and is generally found below the radiohumeral joint. In one of our cases there was extensive ecchymosis which encircled the affected elbow and extended as far up as the middle of the arm.

Fracture of the head or neck of the radius may be accompanied by luxation of the elbow, fracture of the external epicondyle and occasionally by injuries of the wrist.

An interesting condition, especially in children, which should be remembered when making a differential diagnosis of the various elbow injuries is that known as traumatic palsy of the forearm. It is one in which a partial dislocation of the head of the radius results from a trauma to the upper extremity. The history of the nature of the trauma and the subsequent picture are characteristic. The patient had been dragged by the wrists or raised by the wrists, following which there is disability and pain when manipulation of the affected extremity is attempted. The limb hangs limply at the side as if it were a flaccid paralysis. Hence its name. Slight swelling at the elbow may be present. Ecchymosis, false mobility and deformity are lacking. Passive flexion and extension of the elbow are free and painless. Pronation and supination of the forearm are limited and painful. Upon extreme supination a clicking sound is heard, at which time the head of the radius slips back into its normal position. Immediately thereafter there is resumption of the normal function of the limb. This condition is by no means uncommon and should always be remembered when diagnosis of elbow injuries is made.

ETIOLOGY.

In a series of 150 fractures of the elbow we have met with sixteen in which there was either a fracture of the head or neck of the radius or both. This is about ten and a half per cent. of the series. Of the sixteen, ten or about two thirds were in females and six in males. The youngest patient was two years of age and the oldest was fifty-two. Seven of the patients gave a history of a fall and striking upon the outstretched palm. The height of the fall varied from a distance in one instance of two steps and in another of fifteen steps. Others slipped and fell on the pavement. One child fell from a high chair. The other nine had sustained the fracture as a result of direct violence, that is an injury in which the outer aspect of the elbow was the recipient of the blow.

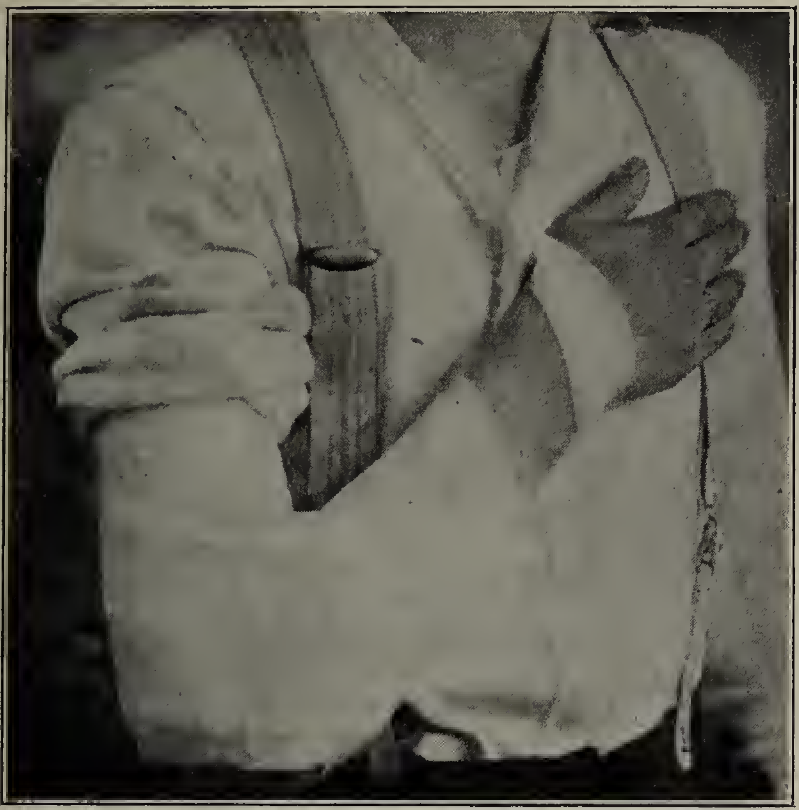

Fig. 1.—Author's method of retaining the forearm in acute flexion.

VARIETIES OF FRACTURE.

Most of the fractures were of the head of the radius. The head was cracked in one portion with occasionally displacement of the fragment. In one instance there was a stellate fracture. Some showed fracture of the neck and these fortunately were impacted. In a few instances both the head and neck were the site of fracture. None of the cases showed marked displacement of the fragments. Hence operative interference was unnecessary.

SYMPTOMATOLOGY.

Subjective.—The chief complaints in every instance were pain and disability.

Objective.—The commonest objective symptoms were swelling, ecchymosis, and tenderness. The swelling was usually localized in the outer side of the elbow in the region of the radiohumeral joint. Ecchymosis varied in extent. In some instances it was very trivial. In one instance it encircled the entire elbow and extended to the middle of the arm. It usually appeared about thirty-six hours after injury. The tenderness was excruciating and of the wincing type. It was elicited by direct pressure and also by supinating and pronating the forearm. It was usually localized to the region of the radiohumeral joint.

TREATMENT.

The treatment of fracture of the head and neck of the radius is the same as that used in the treatment of intraarticular fractures in general. One must remember that the head of the radius lies wholly within the joint, is covered with synovial membrane and is bathed with synovial fluid. Hence fracture is usually accompanied by traumatic synovitis and some hemorrhage within the joint. In view of these facts the best treatment is immobilization with early baking. Movements should be delayed until the swelling in the radiohumeral joint has subsided. In selecting an immobilizing agent, one must remember that the head of the radius enters into the formation of two joints, the radiohumeral and the radioulnar and the fixation agent must control both these joints. A very simple and efficient fixation agent is one which maintains the elbow in acute flexion. The bare forearm is fully flexed so that the hand rests on the opposite shoulder and the elbow is carried well forward on the chest. The position is fixed by a strip of adhesive plaster encircling the arm and forearm just above the elbow joint. The forearm is now bandaged to the arm by figure of eight turns of a flannel bandage. Before applying this dressing the arm should be dried and powdered and boric acid cotton placed in the elbow crease and axilla to absorb the perspiration and keep the parts dry. The limb is retained in position by a sling around the neck.

Immobilization should be continued until the swelling in the radiohumeral joint disappears. Baking should be begun immediately and continued daily throughout the treatment. Passive movements followed shortly by active movements should be begun as soon as the fluid in the joint disappears.

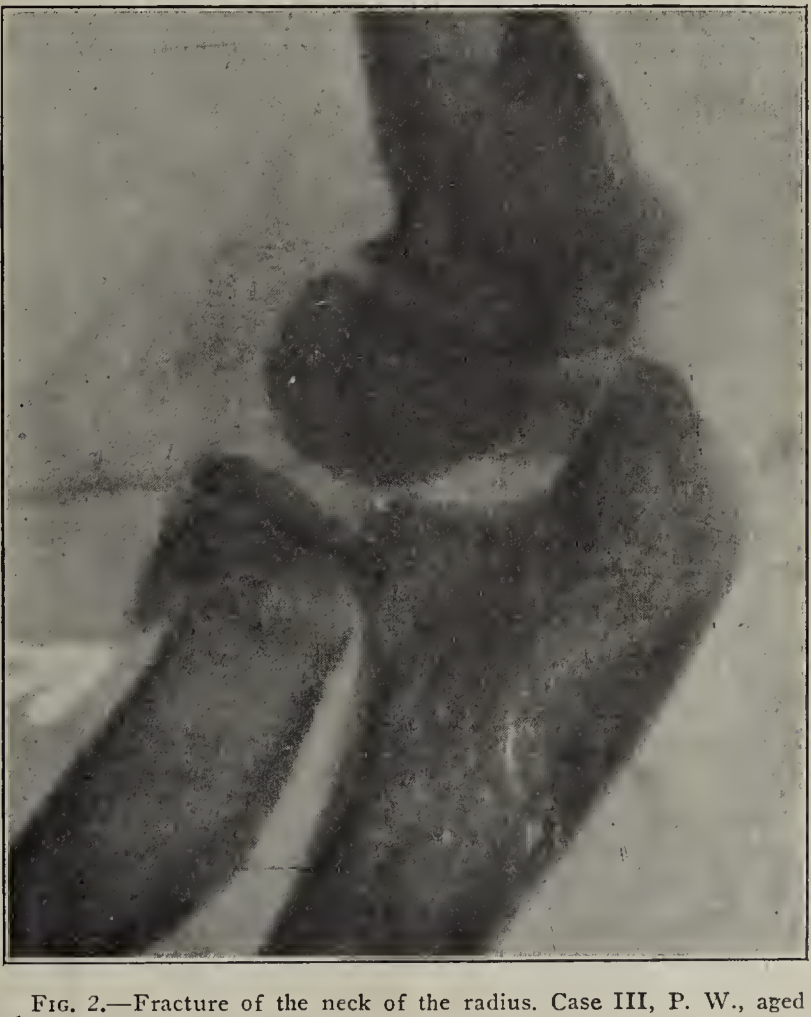

Fig. 2.—Fracture of the neck of the radius. Case III, P. W., aged eleven.

Where a fragment has been separated and displaced, so as to block flexion of the forearm and it cannot be reduced by conservative measures, operative interference may become necessary whereby the offending fragment is either replaced in its proper position or removed.

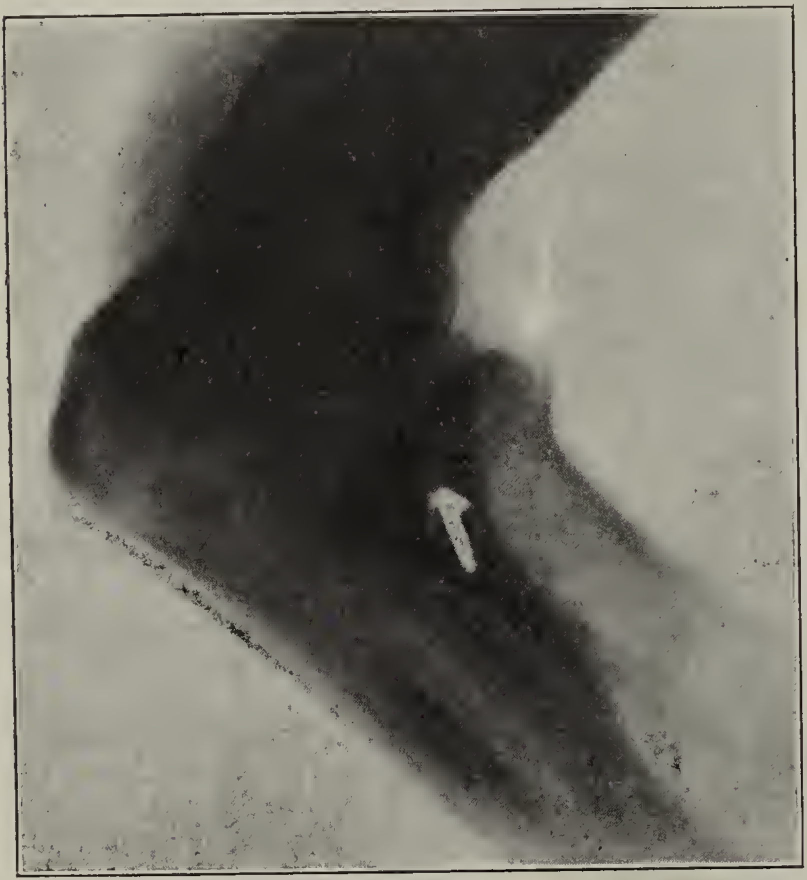

FIG. 3.—Fracture of head of radius. Case IV, J. M., aged twenty-four years.

PROGNOSIS.

The prognosis is good in all cases except where the fragment is too small to be replaced and in old cases where proper reduction and immobilization were not performed.

CASE REPORTS.

CASE I.—Pearl D. slipped and fell downstairs a distance of four steps, striking the outer side of her right elbow. There was pain referred to the affected elbow and disability. There was slight swelling localized in the region of the radiohumeral joint. Ecchymosis was absent. There was no deformity. The relationship of the three processes (external, internal condyles of the humerus and the olecranon process of the ulna) was not disturbed. There was excruciating tenderness over the upper part of the radius in the region of the neck. Flexion and extension of the elbow were almost normal, pronation and supination of the forearm were very painful and restricted. A diagnosis of fracture of the neck of the radius was made and proper treatment instituted. Subsequent x ray confirmed the diagnosis. The patient made an uneventful recovery, being discharged four weeks after the initial visit to the clinic.

CASE II.—Anna K., twenty-four years of age. One week before her visit to our clinic the patient tripped and fell down stairs, a distance of fifteen steps. She landed on her outstretched hand. There was pain referred to the right elbow and lower part of the arm. Complete disability was also present. There was marked swelling localized in the entire elbow and lower part of the arm. Ecchymosis was extensive and encircled the elbow and covered the lower part of the arm. Extension, flexion, rotation of the forearm were very painful and markedly restricted. There was excruciating tenderness over the upper part of the radius, in the region of the radiohumeral joint. A diagnosis of fracture of the head of the radius was made and proper treatment instituted. Subsequent x ray picture confirmed the diagnosis. The patient made an uneventful recovery five weeks after her first visit to the clinic.

CASE III.—Phillip W., eleven years of age, slipped and fell, striking on his outstretched hand. The chief complaints were pain in the right elbow and disability. There was swelling localized to the outer side of the right elbow in the region of the radiohumeral joint. Ecchymosis was present and localized to the outer side of the elbow. The relationship of the external condyle, internal condyle and the olecranon process was not disturbed. There was excruciating tenderness over the upper part of the radius in the region of the neck. Flexion and extension of the elbow were slightly restricted. Pronation and supination of the forearm were painful and markedly restricted. A diagnosis of fracture of the neck of the radius was made and proper treatment instituted. Subsequent x ray picture confirmed the diagnosis.

The patient made an uneventual recovery, being discharged four weeks after the accident.

CASE IV.—John Mc. E., twenty-four years of age. A few days before his visit to our clinic the patient fell and struck on his outstretched hand. Shortly thereafter he experienced severe pain in his elbow. There was also disability. There was swelling localized to the outer side of the elbow in the region of the radiohumeral joint. Ecchymosis which was trivial was localized in same region. The relationship of the external condyle, internal condyle and olecranon process was not disturbed. There was excruciating tenderness localized in the upper part of the radius in the region of the head. Flexion and ex-

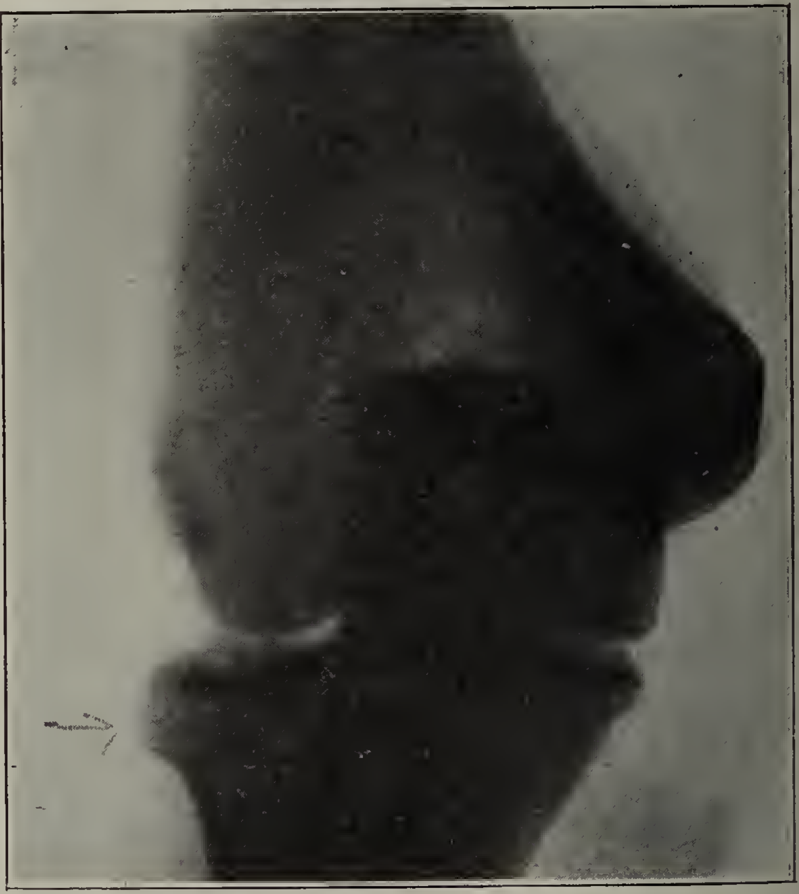

FIG. 4.—Another view of Case IV.

tension of the elbow were slightly restricted, pronation and supination of the forearm were markedly restricted and very painful. A diagnosis of fracture of the head of the radius was made and proper treatment instituted. Subsequent x ray picture confirmed the diagnosis. The patient made an uneventful recovery, being discharged five weeks after the onset of the injury.

The histories and physical findings of the remaining cases are practically identical to those just enumerated, hence the report in detail will be omitted.

SUMMARY AND CONCLUSIONS.

1. Fracture of the head and neck of the radius is not an uncommon condition. Sixteen cases having been present in a series of 150 cases of elbow fractures.

2. It may result from a fairly mild trauma, either direct or indirect.

3. The best position and method of treatment is that of acute flexion.

4. Baking should be instituted from the first. Motion, either active or passive, should be delayed until the fluid has disappeared from the radiohumeral joint.

5. In arriving at a diagnosis one should always eliminate the presence of socalled traumatic palsy.

6. The prognosis is good in all cases except in those in which the fragments are so small and displacement so marked that they cannot be replaced. In these cases operative interference must be resorted to.

1182 Jackson Avenue.

The Indications for the Transfusion of Blood*

By I. S. RAVDIN, M.D.,
Philadelphia.

The history of transfusion in the middle of the last century is being repeated at the present time. From 1863 to 1884 transfusion was supposed to be a cureall and the assertions made for it were preposterous. Cohnheim, in 1883, in reviewing the literature on transfusion up to that time, stated that it was inexcusable to use any blood for intravenous injection in which clotting had already taken place, or blood of another species. But until Von Bergemann in 1884, published his important work, transfusion was still a subject of great interest. He came to the conclusion that the only permissible transfusion was the direct one from artery to vein. That the failures were far greater than the successes can be seen in the action of the French government, which forbade the procedure until the Faculty of Paris should give its approval. Such death blows to a process already on the wane because of the frequency of its disastrous results, together with the fact that the use of saline solutions for intravenous injection was becoming more general, caused the transfusion of blood to be abandoned as a therapeutic measure.

In 1898, Crile, of Cleveland, began a series of experiments which marked the introduction of transfusion as a safe and valuable therapeutic procedure. He began by using arteriovenous suture, which came into existence through the work of Payr and Murphy. He later adopted the ring cannula method, first suggested by Nitze in 1897 and carried out by Payr in 1900. The technic of vascular anastomosis became so perfected through the work of Carrel, of the Rockefeller Institute, that this method, in the hands of men experienced in bloodvessel surgery, came into vogue. Crile's cannula method, as well as Carrel's method, presented so many technical difficulties for the average surgeon that other methods were sought for. Then in rapid succession followed the paraffined glass cylinder method first advocated by Kimpton and Brown in 1913 and later by Vincent and Percy, with their modifications. After this, in 1913, came the syringe cannula method of Lindeman. Ziemssen had used this method twenty years before, but it never became popular until revived and perfected by Lindeman. In 1916, came the simultaneous work of Lewisohn and Weil in this country, of D'Agote in Buenos Aires and of Jeanbrau of Montpelier on the use of sodium citrate as an anticoagulant.

Heretofore hirudin, ammonia and the oxalates had been advised and widely used as anticoagulants, but each in turn had been discarded. The work of these four men reopened the entire subject of transfusion. At about this same time (1916) Satterlee and Hooker also described their pipette cannula method.

Since then the modifications have been too numerous to mention. Brenziger, Martin and Lee, and Unger have described apparatus which can be used successfully by surgeons trained in their use. The chief fact to come out of all the recent work, however, is that nearly all the blood from donors can be obtained by the needle, using one of the many described, and that in at least a large percentage of cases the blood can be given by the needle, thus avoiding the destruction of a useful vein.

Very recently the choice of method has been the source of considerable argument. Surgeons who have used the citrate method successfully are perhaps too inclined, because of its simplicity, to regard it as the method of choice in all cases. On the other hand advocates of the unmodified method especially those who are using apparatus of their own design have been only too eager to condemn the citrate method.

In the majority of cases the successful administration of the blood, not the method, is of prime importance. The extreme opposition to every other method by a surgeon advocating his own apparatus makes one wary of the reliability of the judgment of many of the recent writers. When one considers that an institution like the Mayo Clinic with an experience running up in the thousands routinely uses the citrate method, we know that its antagonists must exaggerate its dangers. There are undoubtedly cases such as the severe anemias in which less reaction follows the administration of blood by one of the unmodified methods, however as a general rule it is safe to leave the choice of the method to the surgeon with experience in transfusion.

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*Read before the Northern Medical Association of Philadelphia.

Since frequently the transfusion is done by the intern or house surgeon whose experience and skill is limited the preferable methods are the citrate method of Lewisohn and the unmodified method of Kimpton and Brown. While it is true that the Lindeman and Unger methods may have some advantages such as the rapid transference of small quantities when unmodified blood is used they are frequently unsuccessful when used by the tyro.

INDICATIONS.

It is a mistake to consider transfusion as a cureall or as a last resort in hopeless cases. The physician who is not carried away by an enthusiasm similar to that of the period from 1836 to 1884 will be better able to define clearly the useful indications for transfusion.

We have found the indications divisible into three groups, and increased experience in the procedure will give the clinician definite ideas of the types of cases which will benefit by it.

Loss of blood.—To this group belong all those cases of anemia from acute hemorrhage as well as those cases due to small, long continued blood losses. Some of the latter, however, finally fall into the second group.

Diseased blood.—Transfusion for this group serves the following functions: 1. To stimulate hematopoietic function. 2. To increase coagulability. 3. To add to the oxygen carrying capacity. 4. To increase the bactericidal or autotoxic properties of the blood. 5. To increase the general nutrition.

Blood transfusion is invaluable in all cases of hemorrhage after injury or operation. In this group belong the hemorrhages of childbirth, ectopic gestation, miscarriages, fibroids, and other uterine hemorrhages. Acute bleeding from injuries, from gastric, duodenal or intestinal ulcers, and from ruptured viscera belongs here also. In the case of acute massive hemorrhage the surgeon sees the most miraculous results following transfusion. One of our patients admitted cold, pulseless and unconscious after a crushing injury to the thigh was revived by transfusion of 2100 c.c. of citrated blood. These patients can be operated on much more safely and the convalescence is much more rapid with a transfusion than without. The average amount of blood which we use for transfusion in acute hemorrhage is 750 to 1000 c. c.

The question of when to transfuse for acute hemorrhage depends upon the surgeon, but we are sure that if all borderline cases were transfused before the socalled limit of bleeding was reached the mortality from acute hemorrhage would be less. This will not only make up for the blood loss but it will also undoubtedly help to check the hemorrhage, provided the amount of blood given is not too large or given in too short a time.

In repeated small hemorrhages the anemia may become so marked that the blood picture will simulate that of a primary anemia. Transfusion before the hemorrhage is controlled, and after this until the blood picture again assumes a somewhat normal appearance, act nearly as specifically as in the first group. In cases of chronic bleeding the coagulation mechanism becomes deranged and the longer the bleeding continues the less likely it is to stop spontaneously, although the coagulation time of the blood outside of the body is but little delayed.

In these cases we transfuse repeatedly once or even twice a week, until the blood picture shows that the blood forming organs are again functioning normally. In this way an apparently poor surgical risk may be turned into a good one.

Diseases of the blood.—Here the new blood acts as a therapeutic agent. First, through hematopoietic function. In this subsection belong the primary anemias and extreme secondary anemias. The transfusion is done with the hope that it will stimulate hematopoietic function. This probably occurs through the products of blood disintegration which stimulate the bone marrow. The fate of the transfused blood as recently determined by Ashby must also be considered. She sums up her conclusions by saying "The life of the transfused corpuscle is long; it has been found to extend for thirty days or more. The beneficial results of transfusion are without doubt not due primarily to a stimulating effect on the bone marrow, but, it is reasonable to assume, to the functioning of the transfused corpuscles." Several transfusions are necessary and it is often noted that the second transfusion is of much more benefit than the first. In this type of case we welcome a moderate reaction, since these patients seem to get the best ultimate results. For this reason some writers advise small doses of incompatible food.

Primary pernicious anemia.—Vogel and McCurdy in 1913 first carefully studied the effect of blood transfusion and regeneration in primary pernicious anemia. In our cases we find that, while transfusion is of no permanent value, by repeated transfusions we have prolonged a patient's life for as long as four years. This patient has had sixteen transfusions, in this period, and is still able to go about. We feel that transfusion offers more for pernicious anemia than any other form of treatment and that all patients except those in extremis will benefit by repeated transfusions. The remission which is brought about comes sooner and lasts longer, as a rule, than one occurring under medical treatment alone, and the life of the patient may be saved for some years.

If a remission is not brought about it is well to change donors. In this way results can be obtained by transfusion which make it superior to any other therapeutic measure. The important thing to remember is that under no circumstances should the patient be allowed to become so weak that transfusion is a dangerous procedure, but when the red cells continue to decrease and the hemoglobin reaches 30 it is time to begin transfusions and to continue them at short intervals until the blood picture shows decided improvement.

Aplastic anemia.—Here there is no tendency to blood regeneration, the leucoblastic and erythroblastic activity both being demoralized. Although blood transfusion does not even cause a remission in these cases, rapidly repeated transfusions (twice a week) will so increase the number of blood cells and hemoglobin, and relieve the symptoms that the patient can be comfortable for a variable period, though never a long one.

Splenic anemia.—In this group we include splenic anemia and Banti's disease. Transfusion plus splenectomy offers the best opportunity for obtaining a cure. If the blood count is low after operation the transfusion may be repeated in order to give the blood forming organs an impetus to resume their normal function.

Leucemia.—I have transfused in only one case of leucemia. The patient, who was suffering from acute lymphatic leucemia, was transfused four times within ten days, with a total of 2200 c.c. of blood. When he was admitted his blood count was red blood cells, 905,000; white blood cells, 31,400; hemoglobin, 25 per cent. On discharge his count was, red blood cells, 3,600,000; white blood cells, 45,000; hemoglobin, 33 per cent. However this improvement was only shortlived and an acute exodus followed soon after discharge. This is often the case following transfusion in leucemia and the most we can hope to do is to attempt to tide the patient over until the disease takes on a more chronic form and other treatment can be begun.

Hemolytic icteroanemia.—In this condition transfusion does not offer permanent relief but is of value in improving the anemia enough to warrant the operation of splenectomy, which is a curative measure. Transfusion following the operation shortens convalescence and hastens the return of a normal blood picture.

In the last patient I had, a nurse, transfusion was resorted to five times before splenectomy. At operation a large spleen was removed, a gallbladder full of stones, and a dermoid cyst of the ovary. She was again transfused on the table. The recovery was uneventful.

To increase coagulability.—To this group belong the cases of, a, melena neonatorum; b, hemophilia; c, jaundice; d, purpura; e, secondary hemorrhagic diseases complicating such conditions as grave anemias, leucemias, and severe infections. It is in these hemorrhagic diatheses that we find the results of blood transfusion uniformly good. Melena neonatorum and hemophilia usually yield as if by magic to a single transfusion, although transfusion does not confer immunity to hemophiliacs against further hemorrhage. I have found citrated blood just as efficacious in these cases as unmodified blood. This has been definitely proved by Pemberton. If the first transfusion has not the desired effect, then a second one should be done with a different donor. Temporizing with less effective measures, as horse serum and various coagulants, may cost a life.

In a case of cholemia following cholecystectomy in which the patient had a number of fairly large hemorrhages the patient's condition became very serious and blood transfusion was decided upon. There was immediate improvement in the patient's general condition and there were no further hemorrhages although the patient was transfused thereafter for the secondary anemia.

To increase the oxygen carrying capacity of the blood.—Here belong the cases of illuminating gas poisoning. Only a few cases have been reported. Carbon monoxide has a stronger affinity for hemoglobin than oxygen. When carbon monoxide combines with the hemoglobin the red corpuscle is removed from the circulation as effectively as in acute hemorrhage, as far as its oxygen carrying capacity is concerned. The patient should be bled at the time of the transfusion. This may be difficult because the blood often becomes of a syrupy consistency.

To increase the bactericidal and antitoxic properties of the blood.—Transfusion has no place in the acute infections unless the socalled vaccination transfusions suggested by Heyd and Hooker, that is, transfusion with immunized blood, open new possibilities. There is, however, a large group of cases suffering from subacute and chronic infections which is materially benefitted by transfusion. These patients as a rule, are profoundly anemic, and transfusion should not be delayed until the body has lost its power of reaction. The transfusion is a stimulant to the hematopoietic organs, throws into the circulation functionating corpuscles and at the same time probably contains antibodies which may affect the life of the organism causing the infection, or so stimulate the patient's forces as to help them to develop an active immunity. Cases of chronic suppurating wounds do more than justify the procedure. We have used it in chronic suppurative disease of the hip joint and in malignant endocarditis. While the results in the latter were not especially favorable those in the former have been exceptionally good.

For its antitoxic effect transfusion is of use in the toxemia of pregnancy with doubtful results, and in sprue, purpura and pellagra. While the beneficial effect is undoubted in purpura, in the other conditions the results are as yet doubtful. Lindeman reported four cases of tropical sprue treated by transfusion, with apparent recovery in every case. In the toxemia of pneumonia transfusion has been used with questionable results. Our only patient, in extremity when transfused, died.

As a stimulant in the various cachexias.—Here the transfusion is used for its general nutritive effect. It improves the vitality of the tissue cells. It frequently will permit radical operative procedure which before transfusion would have been out of the question. In debilitating conditions such as inoperable carcinoma it will improve the patient's general condition and prolong life, but its use in cases of this type is one of the causes for the procedure again falling into disrepute. A field open to its use is the malnutritions of childhood, especially marasmus, and cachexia from prolonged diarrheas.

Shock.—The value of transfusion in shock, especially if associated with hemorrhage, has received so much attention recently that it is needless to discuss it further here. It is just as useful in civilian as in military practice. In the cases of shock without hemorrhage, in which there is apparently no change in the blood volume, we must not expect as brilliant results as in those associated with hemorrhage. If an operation is necessary the patient who has been transfused is better able to stand the shock due to additional trauma.

An ingenious means of meeting this indication in patients who are to undergo long operative procedures has recently been devised by Dr. Grant of the University Hospital. Plethoric patients who were being prepared for cranial operations were bled twenty-four to thirty-six hours before operation and the citrated blood which had kept on ice was reintroduced when the first evidences of shock appeared.

CONCLUSIONS.

1. Transfusion is a specific in acute hemorrhage where the socalled limit of bleeding has not been reached, in melena and in the hemorrhage of hemophilia.
2. It is of definite value in primary pernicious anemia in hastening and prolonging remissions. It is indicated in cases of severe secondary anemia—after transfusion operations on debilitated or anemic individuals may often be safely undertaken that otherwise would involve a serious risk.
3. Transfusion in shock is not as efficacious as in cases of shock with hemorrhage.
4. We have not been able to prove the value of transfusion in acute infections, but in chronic infections we have had results justifying its use.
5. It is of improved value in acute leucemia. In aplastic anemia it is a palliative measure.
6. In the severe anemias the use of unmodified blood by one of a number of methods is probably to be preferred but in all other conditions the citrate method will give equally good results.

1930 SPRUCE STREET.

An Improved Method for Diagnosis and Localization of Duodenal and Gastric Ulcers*

By S. L. CASH, M.D.,
New York.

A large number of peptic ulcers escape discovery. Hemorrhage, large or small, from the lesion continues an important factor in diagnosis, and may be found in about the same number of active cases in which the x ray is effective. X ray findings or blood from the lesion may each be the deciding feature in a given case.

As a comparison of the prevalence of blood in ulcer with x ray findings, a classical illustration representing maximum results is the table of Baetjer and Friedenwald (1).

Total 743, x ray positive 84.4 per cent., blood about 60 per cent. with 516 examined.

Cases proved by operation 185, x ray positive 79.4 per cent., blood 84 per cent., 108 in 128 examined.

Undoubted cases not proved by operation 323, x ray positive 84 per cent., blood 81 per cent., 205 in 255 examined.

Doubtful cases 235, x ray positive 89.7 per cent., blood 81 per cent., 108 in 133 examined.

These figures, while high, prove ulcer a frequent cause of gastric and duodenal hemorrhage, that is, blood in slight or profuse quantity, and it is necessary in applying the stool test to consider sources other than ulcer of blood in the digestive tract. About ninety-five per cent. of duodenal ulcers are situated within an inch and a half of the pylorus; ten to seventeen per cent. are on the pyloric ring. Of gastric ulcers four fifths are on or near the lesser curvature and posterior wall.

Another feature is, as Moynihan expresses it, "a remarkable and sustained contraction of the circular muscular fibres of the stomach that occur in or near the segment on which the ulcer is situated." These are factors in the use of the string test; with blood at the lesion even where it is slight they make the test practical.

Einhorn's string test is an ingenious instrument, but has objections, all due to its small size. To remove these objections I have used a test made from a loosely knitted tubular silk braid. It is white, flexible, compressible and half an inch in diameter. The test consists of two parts; the upper, extending from the teeth, is a silk string, preferably No. 15 twisted silk. The lower part of the test is a section of the braid.

For the lower part of the stomach and the duodenum the average length of the braid is ten to fourteen inches, the attached string ten to sixteen inches. For the lower part of the esophagus and the upper part of the stomach the anchor string is shortened; in gastroptosis cases and the lower part of the duodenum greater lengths of the parts are required. Repeated tests show the length of the string or braid necessary. Measurements from the teeth to the pylorus vary from a fixed standard in different subjects and to locate this part by arbitrary measurements is subject to error.

No cup is needed since the braid offers obvious evidence in three ways of its passage through the pylorus. The braid is easily swallowed. A practical method is to fold the braid into a compact mass, moisten it with water, milk or ice cream, and use water or milk if necessary to wash it down; or it may be enclosed in a cachet. It is swallowed at bedtime, the patient being careful to take no food or drink with the slightest coloring, for a number of hours previous to swallowing.

Appreciation by the physician of the motor function of the stomach will govern this time. The braid must remain in place at least three hours or, if no discomfort ensues, which is rare, until morning.

Hot water sipped slowly facilitates passage of the pylorus. On removal of the braid, which the patient may do, it should not be touched, but suspended free from contact until dry. Under these conditions it will retain the shape acquired while in place. Or if a microscopical or chemical examination is required, the physician should remove it.

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*Read at the Bellevue Hospital Alumni Society, November 1, 1922.

As a routine at least three tests are given. One for the pylorus and duodenum, then one for the stomach, and the third according to findings of these, in conjunction with the history, physical examination, etc. If the patient is a good subject two braids may be used in the stomach at the same time; one is sufficient in the duodenum.

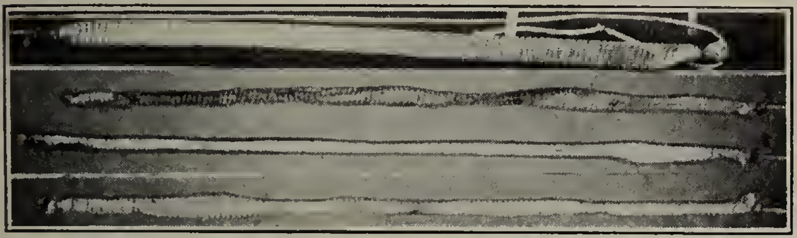

Fig. 1.—1. Braid test before use. 2. Chronic gastric ulcer two inches in diameter near pyloric orifice; blood stains from edges of ulcer; between these braid not constricted; prevented by induration, pyloric constriction below second spot, no bile stain; verified by operation: also beginning carcinoma. Entire braid colored dirty brown from blood and seropurulent mixture; blood, pus, epithelium. 3. Hour glass stomach, gastric ulcer lesser border. Small stain upper part. Second test, five months, similar in detail, stain, constrictions, etc. 4. Syphilis of stomach; in first or second part of duodenum, constriction at lower part; bile stain to lower blood stain.

The features of the braid are: 1. A large surface for contact, with large stains for gross, chemical, and microscopic examination. 2. Size and compressibility permit contact with irregular surfaces. 3. Size and texture prevent cutting of the tissues. 4. Compression of the braid by the pylorus localizes this part and thereby the lesion, whether duodenal, gastric or pyloric. 5. Passage through is also shown by bile stain, in conjunction with the pyloric and other markings on the braid. Bile regurgitation is indicated by the approximation of the bile stain to the pyloric marking and by the degree of bile coloring, and as evidence of duodenal obstruction is valuable when bile is not vomited nor obtained from the stomach. A spastic pylorus prevents bile regurgitation into the stomach in the majority of instances of duodenal obstruction. Localization of the pylorus by the braid is an aid in determining the length of the tube needed in nonsurgical draining of the gallbladder, in duodenal lavage, and in treatment of ulcer with the duodenal tube. 6. It is useful in testing the progress of healing and for posttreatment observation. 7. It eliminates the cup and bulb which in aggravated ulceration at least are objectionable. The cup may be used with the braid. 8. When the x ray reveals the lesion the braid determines whether it is acute or chronic. Where the x ray is not obtainable or is inefficient the braid test may be useful. 9. The braid proportioned for the stomach has free play in contrast to the string test that extends into the duodenum with a bead or cup attached.

Any acute or unhealed ulcer will give off blood, and by repeated application of the tests a stain should be obtained. A degree of judgment and persistence in applying the test is a requisite. It has proved the prevalence of remittancy in ulcers, particularly duodenal. Similarity of constrictions, or lack of them, and twists and strains in several tests from the same subject are interesting and this shaping and staining is permanently retained. The mucus hardens and fixes it after drying. Other uses for the braid are suggested, as in treatment, and as a test for acid in the stomach when the tube cannot be used.

Case I.—In this patient the symptoms began six years previously, with constipation, and during the past three years he had suffered from the sensation of fullness after meals, with much belching half an hour after meals, and lasting one to three hours. This was relieved by milk of magnesia. He also suffered from occasional headaches, and had a poor appetite the past two months.

The first braid test for the lower stomach and the duodenum was negative for blood, with a faint bile stain from lower end to pylorus. The second test showed heavy bile stain reaching to the pylorus.

The third test, that extended to the first part of the duodenum, gave a heavy blood stain with marking fourteen inches from the teeth and no bile. The fourth test of same length showed a shorter but deep blood stain at the same distance with no bile. Later while under treatment in bed, two other braid tests were given and showed bile stain on the duodenal part reaching to the pylorus.

These verified the previous diagnosis of duodenal obstruction, evidenced by duodenal succession on repeated examination. Operation showed an unusual duodenal dilatation with mesenteric obstruction; there was a slight thickening of the pyloric ring but no other evidence of ulcer. This case illustrates the importance of repeated tests with the braid.

Case II.—The symptoms were indefinite. There was a palpable tumor in the epigastrium, small, hard and smooth with slight pain on pressure. A braid obtained a stain at the outlet of the stomach, and showed spastic contraction of the stomach and pylorus. The Wassermann test was two plus, and the x ray showed an irregular thickening of the first part of the duodenum. Specific medication was given and two months later a second x ray photograph showed that the tumor had almost disappeared. A braid test at the time gave no stain.

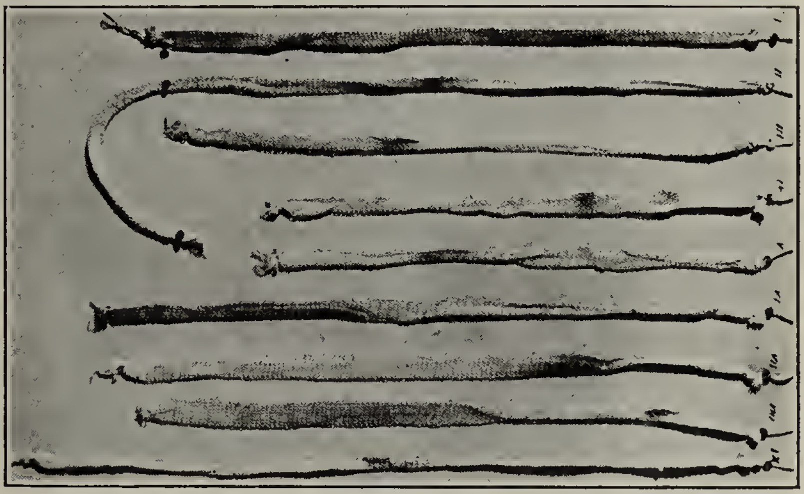

Fig. 2.—1. Duodenal obstruction, bile stain heavy to pylorus, verified by x ray and operation. 2. Pyloric ulcer, no bile stain on four tests, no duodenal obstruction, verified by operation. 3. Duodenal ulcer first part, note pyloric constriction above blood stain, blood stain to lower end. 4. Duodenal ulcer first part, a large one or two smaller shown by two blood spots; pyloric constriction above, constriction by duodenum below. 5. Pyloric ulcer, verified by x ray. 6. Duodenal ulcer, duodenal obstruction; near pylorus, on each side of small dark blood stain fainter blood stain shows with evidence of friction (hyperperistalsis), bile stain to blood spot; verified by x ray and operation. 7. Duodenal ulcer, duodenal obstruction; pyloric constriction above stain, bile stain, moderate (does not show on plate) to blood spot. 8. Jejunal ulcer following gastroenterostomy six tests positive. 9. Ulcer of duodenum, first part, no bile stain, marked contraction (spasm) of stomach, pylorus and duodenum.

REFERENCE.

1. Baetjer and Friedenwald: *Bulletin of the Johns Hopkins Hospital*, 29, 177, 1918.

A New Frontal Sinus Instrument

By J. A. HAGEMANN, M.D.,
Pittsburgh, Pa.,
Otorhinologist to the Pittsburgh Hospital.

The equanimity enjoyed when using an implement virtually insuring immunity from mishap prompts this presentment of a gouge for use incidental to the operation of draining the frontal sinus. If a Hajek chisel four mm. wide could be bent to an arcuation of 35°, beginning three and a half cm. from the point, with the concave gutter on the convex side of the curve, one would in effect have the instrument devised by me.

The many methods that have been contrived to attain a cure for acute or chronic frontal sinusitis bear witness to the unsettled condition of the problem. Since 1882, when Kocher reported his results in empyema and hydrops of the frontal sinus by entirely removing the anterior wall, a host of modifications have been suggested and practiced. The repellant deformity left after the obliteration of the sinus prompted many to seek an intranasal route that would establish permanent drainage. If human skulls were uniform one might with some assurance shape one's course in accord with the several authors' suggestions. But unfortunately the frontoethmoidal areas vary in brachycephalous and dolichocephalic heads with their sundry modifications, and one must ever feel apprehensive that, in groping, the cerebral compartment may be ingressed. Furthermore, even after one has successfully passed a guiding sound into the sinus by the nasal route, the subsequent laborious abrading with rasps is rather an unsatisfactory procedure. It is conceded that the majority of cases in which an exigent submucous resection of the nasal septum with resection of the anterior third of an obstructive middle turbinate, and exenteration of the anterior ethmoid cells has been done, they will get well under palliative measures. For such as do not respond to this treatment a more radical procedure becomes imperative.

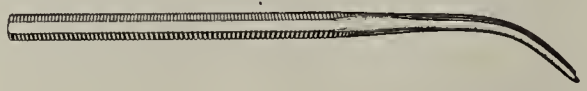

Fig. 1.—Frontal sinus instrument devised by author.

PREOPERATIVE PROCEDURE.

I proceed in the following manner. On the day preceding that of operation, the emergence of the supraorbital nerve from its foramen is indicated by drawing a perpendicular line through the eyebrow with a thin, moistened crystal of nitrate of silver at that point. This becomes a black stroke, serving as a caveat so that one may not inadvertently divide the nerve which would entail protracted, if not permanent, anesthesia of the frontoparietal region. The operation is done under ether anesthesia. The eyebrow is not shaved.

Preceding the administration of the anesthetic, a pledget of gauze saturated with solution adrenalin chloride one to one thousand, is packed into the upper, anterior portion of the nasal cavity of the affected side. This pledget is not removed until the external feature of the operation has been completed. When anesthesia has been attained, plugs of gauze are placed in both posterior nares in the customary way and secured by having strings of the commercial umbilical tape tied about each plug, brought out through the nares and tied taut together behind the head. A mouth gag is inserted and kept in position throughout the operation. With such precaution one is enabled to observe if any blood be accidentally transuding through the postnasal sponges and the anesthetist can more readily perform his functions without discommoding the operator.

TECHNIC OF OPERATION.

After the customary preparatory toilet of the operative field, an incision, penetrating the periosteum, is made, beginning in the midst of the eyebrow just mesial from the dark silver line, and, following the middle of the eyebrow, extending elliptically downward and inward for about three and a half cm. toward the nasal bone. The periosteum is quickly elevated and the spurting vessels stopped by torsion. While an assistant holds the edges of the wound apart by means of small retractors, an opening is made into the sinus with a small gouge and mallet. This aperture is sufficiently enlarged with a ronguer to permit inspection of the interior of the sinus. Pus, granulation tissue or polyps are removed with a spoon curette. Then a section of the anterior wall four mm. wide is removed by cutting upward, parallel with the perpendicular line of the body, with an angular rongeur, as far as the extent of the sinus will permit.

A slender probe is now passed downward through the ostium frontale into the nose and left in this position. The adrenalin soaked pledget of gauze is removed from the nose. The vertical gap made in the frontal wall permits the introduction of my gouge in such manner that its point will hug the under side of the nasal bone when being driven downward with the mallet. This obviates the contingency of a possible encroachment upon dangerous ground.

If the channel communicating with the nose thus fashioned be deemed inadequate, it may be enlarged by use of a rasp. No packing is left in the sinus or nose. The exterior wound is closed with three skin sutures. A dry, sterile pad of gauze is securely bandaged over the wound and respective eye. The postnasal plugs are removed. Before the patient leaves the operating room the intranasal wounded surface is liberally swabbed with a saturated solution of coagulin to obviate the bleeding that sometimes occurs when the ischemia from the adrenalin is waning. There is usually union by primary adhesion leaving a scarcely perceptible scar and the patient may leave the hospital about the tenth day after the operation.

Highland Building.

Bacterial Vaccine Immunization Under Bacterial Intoxication

By G. H. SHERMAN, M.D.,
Detroit, Mich.

No question in medical practice is of more importance than a concrete concept of the influence bacterial vaccines have when given in cases of extensive bacterial intoxication due to acute infection. Much animal experimental work has been done to determine the source of bacterial intoxication but nothing definite has been ascertained by this method concerning the source of the bacterial poison produced by germs like the streptococcus, pneumococcus, staphylococcus, and colon bacillus or the socalled endotoxic organisms. It has been assumed that all the toxic symptoms from infections by endotoxic organisms are due to the setting free of endotoxins as a result of a disintegration of the organisms during the course of the infection. That these germs possess toxic substances in and of themselves, even after they are killed, that will produce toxic symptoms when injected into healthy animals goes without saying, but that does not prove that the intoxication in an active infection is mainly, in part or at all, due to endotoxins derived from disintegrated or destroyed organisms during the process of the infection. Teale (1), by carefully conducted animal experiments, shows that bacterial intoxication is not due to preformed specific endotoxins. Vaughan's contention that bacterial intoxication is due to a splitting up of a bacterial protein and thus setting free the poisonous portion by proteolytic ferment action has never been proven.

The proteose poisoning theory of bacterial intoxication due to absorption of the antitrypsin in the plasma by the infecting bacteria has never been conclusively demonstrated clinically or experimentally. So it appears that some of the oldest concepts along the line of bacterial intoxication are not being sustained.

That bacterial intoxication is not due to a setting free of endotoxins as a result of germ disintegration during the course of an infection may be demonstrated by induced immunization in acute streptococcic infections. Take a case of streptococcus lymphangitis or cellulitis showing rapid extension of the infection with a temperature of 102° or 103° during the first few days with everything indicating a steady progress of the infection for example. Here we have every evidence of the presence of a large number of infecting organisms rapidly increasing in number. By giving a suitable dose of vaccine subcutaneously, and repeating at twelve to twenty-four hour intervals, it is a common experience in such cases to find a material drop in temperature to normal or near normal within twenty-four to thirty-six hours with clinical indications of a retrogression of the infection. This clinical picture shows a positive decrease in germ growth and activity evidently due to a rapid destruction of the infecting organism. If toxic symptoms were due to the liberation of endotoxin from destroyed germs we should have a rise of temperature with increased toxic symptoms after the vaccine injection. But we find the reverse to be true—no rise of temperature but a steady fall. It was the results obtained in this class of cases that induced Wright (2) to say: "Most dramatic and convincing are the successes obtained in streptococcal lymphatitis and streptococcal cellulitis."

Let us take an impending lobar pneumonia during the first six hours after the initial chill with lung congestion progressing toward consolidation, the patient coughing up blood streaked mucus with severe pain in the chest and the temperature about 102.5° for example. In this condition the patient is certainly harboring a large number of pneumococci, the organisms being in the blood as well as in the lungs. By giving such a patient, in this early stage, a subcutaneous injection of a polyvalent pneumococcus, streptococcus, combined vaccine containing 100,000,000 of each organism, and repeated at twelve to twenty-four hour intervals, a normal temperature with an arrest of the infection will be obtained in a vast majority of cases within twenty-four to thirty-six hours with a speedy recovery if the vaccine treatment is continued. Here again we have clinical evidence of rapid germ destruction without toxic symptom development, showing that during the immunizing process with rapid germ destruction, no bacterial intoxication develops from the setting free of the endotoxins contained in the destroyed germs. Wynn (3), a prominent authority of Birmingham, England, was so impressed with the favorable results from the early use of bacterial vaccines in the treatment of pneumonia that he said: "So striking have been the results when vaccines are injected early that I would urge the adoption of this practice." In another article (4) he gives a detailed report of 107 cases of pneumonia which he treated and claims that the use of a suitable vaccine—he employed a mixed polyvalent vaccine—given in the early stages of pneumonia, gives just as striking results as the antitoxin treatment of diphtheria.

I have seen a localized bacterial intoxication develop within four hours from a streptococcus infection produced by a needle prick in the thumb. Within nineteen hours this developed to a streptococcus lymphangitis extending to the shoulder with a temperature of 102.5° and gangrene development at the site of the needle prick. Here the wound was entirely too small to inoculate a large number of germs. Toxic symptoms, however, began to develop soon with every evidence of rapid germ multiplication. It is impossible to ascribe this rapidly progressing bacterial intoxication to endotoxin derived from decomposed killed streptococci or to the poisonous radical of the protein contained in killed streptococci, because this would imply that the streptococci are being rapidly destroyed whereas the entire clinical picture shows rapid bacterial growth. A cultural condition that induces rapid germ destruction never at the same time is conducive to rapid germ multiplication. The endotoxin and split protein theories most certainly do not account for conditions found in such an infection.

It is now generally admitted that germs secrete ferments which they employ to digest the food on which they live. Since this ferment has a destructive influence on the tissues it encounters, it of necessity is toxic. Regarding this germ produced ferment as the real primary cause of bacterial intoxication explains all the phenomena present. The streptococci which were inoculated with the needle found the environment suitable for rapid multiplication. The ferment they secreted rapidly digested the food on which they lived, making rapid growth possible and accounts for the development of toxic symptoms soon after the germs entered the tissues of the thumb. Leucocytes made their appearance but found the condition too toxic to arrest the process. The streptococci continued to grow and multiply with a proportionate increase in toxic ferment secretion to a point of actual tissue destruction with gangrene formation.

The localized toxic effect of the infecting organisms, by means of the ferment they secrete to digest the food on which they live, being recognized and how these involved tissues eventually manage to destroy the invading organisms if recovery takes place, involves the problem of immunization. We know that during the process of overcoming an infection, substances are found as a result of the presence of the infecting organisms that have a destructive influence on these very germs. These substances are commonly known as antibodies and may be regarded as tissue cell produced protective ferments.

The question arises: Are these protective ferments produced by the infected tissues or are they produced by special organs set aside for the purpose of producing immunizing substances? Some pathologists and immunologists believe that antibodies are formed by the internal lymphatic organs. It may be true that in extensive acute infections, the internal lymphatic organs eventually come to the rescue by producing antibodies as a result of the influence brought to bear on them by the toxic materials that have permeated the entire system; but at best this process is a slow one resulting in a prolonged illness and often is too tardy to prevent a fatal termination. The other contention is that all living tissues are endowed with the power of self preservation against bacterial invasion and that these antibodies are produced by the involved tissues themselves as a result of the presence of the infecting organisms. It is readily explained why this is also a prolonged process with frequent fatal terminations. The toxic ferments secreted by the infecting organisms have of necessity a destructive devitalizing influence on the body cells with which they come in contact and instead of stimulating these cells in their defensive capacity to produce protective ferments or antibodies, they are overwhelmed and at least temporarily crippled in their defensive capacity, resulting in a tardy development of antibody with a prolonged illness and a possible fatal termination.

Let us consider these two contentions as elucidated by clinical observations of acute streptococcus or pneumococcus infections under the influence of bacterial vaccine inoculations. If the internal lymphatic organs are the source of antibody formation, this would apply to antibodies produced from vaccine injections as well as from localized infections. That acute streptococcus or pneumococcus infections will show marked clinical symptoms of abatement within one or two days after suitable doses of vaccine have been given, at twelve to twenty-four hour intervals, is a fact which is readily demonstrated, and this can only be accounted for on the ground that rapid antibody formation takes place as a result of the vaccine inoculations. The amount of killed streptococci or killed pneumococci, or both if a mixed vaccine is given, is so small—about 0.0004 of a gram—that the amount of toxin it contains would be infinitesimal as compared to the toxic materials already present in the blood and tissues of the patient; in fact, is so small that it produces no appreciable influence in increased temperature or pulse rate, and consequently could not be expected to have any stimulating influence on the internal lymphatic organs, but definite changes for the better do soon take place.

Wright's contention that the antibody is produced by the tissues into which the vaccine is injected readily accounts for the results obtained. The tissues into which the vaccine is injected are not aware that the injected organisms have been killed. They are intruders that possess the biochemical construction of infecting bacteria minus the power to secrete toxic ferments or of multiplication and must be disposed of. Being killed, they can offer no resistance to their destruction by the body cells with which they come in contact and during the process of destroying these killed germs, protective ferments or antibodies are produced for the destruction of live germs corresponding to those contained in the vaccine. To guard against future infections when body cells are once influenced to produce antibodies they continue to do so as a natural provision for some time thereafter. These excessive antibodies are then conveyed by the circulating medium to the infected area and there aid the involved tissues in overcoming the infection.

This offers a rational explanation of what actually happens in acute infections under bacterial vaccine treatment. This action of vaccines also offers a rational basis for giving vaccines in extensive acute infections. As long as a doctor harbors the thought that the toxic portion of a bacterial vaccine must stimulate the lymphatic internal organs he can see no logical basis for giving vaccines in acute toxic infections. He at once visualizes such a patient as having as large a load as he can safely carry and regards the giving of a vaccine as increasing that load. But, if he grasps the viewpoint, as demonstrated by clinical observations, that the tissues into which the vaccines are injected are thereby aroused to the production of antibodies or protective ferments which neutralize the germ produced ferments or toxins and cripple the infecting organisms in their digestive capacity so phagocytes can attack and destroy them, the advantages of giving bacterial vaccines in acute toxic infections become apparent at once. Germs during the process of invasion digest their way into the tissues they involve by means of the ferment they secrete from their surface and with which they surround themselves. By means of this ferment pneumococci and streptococci often digest their way through the epithelial lining of capillary bloodvessels and gain entrance to the circulating blood where they grow and multiply. Wright (2) classifies these organisms because they are capable of growing in the circulating blood as serophytes and shows that they are destroyed by phagocytic action. A serophyte succeeds in maintaining itself against phagocytic action by means of the digestive ferment with which it digests the food on which it lives. This, in fact, is the only means of defense the germ has.

It is this digestive ferment with which the germ surrounds itself that constitutes the essential element of toxicity in an infection. If the germ succeeds in maintaining an efficient ferment for its digestive activities, phagocytes will not make an attack because instead of digesting the germ, the germ would destroy and digest the phagocyte. What in all probability happens when vaccines are injected under the skin in these acute toxic infections is this:

As a result of the presence of the killed germs at the site of vaccine injection, these tissues become actively engaged to produce antibodies to get rid of the injected killed organisms. More antibodies are produced than are required to dispose of the killed organisms and the excess antibody by means of the circulating medium is conveyed throughout the body. The toxins absorbed from the infected area are thus neutralized which accounts for the rapid relief from toxic symptoms. The antibody also combines with the ferment surrounding the infecting organisms and consequently reduces their toxicity and virulence by crippling their digestive apparatus, making them susceptible to attack by phagocytes and accounts for the rapid retrogression of infection in infected areas.

That this is a correct concept of what takes place is aptly illustrated by the relapses which frequently occur if the vaccine treatment is discontinued too soon after good results have been obtained. In lobar pneumonia, for example, if the vaccines are employed during the first day as a rule the temperature and pulse will come to normal within one or two days. If the vaccine treatment is then discontinued, a relapse with a spread of the pneumonic process frequently occurs within a day or two after the vaccine treatment is discontinued which is not the case if the vaccine treatment is continued until all symptoms of infection have subsided. Furthermore it is found that larger doses are required when treating extensive acute toxic infections than in subacute and chronic conditions and the injections must be made at much shorter intervals at least at daily intervals and in severe cases at twelve hour intervals. The necessity of frequently repeating large doses would indicate the quantitative requirement for antibody formation by repeatedly activating fresh areas of tissue cells. That the tissues into which vaccine is injected produce the antibody is also demonstrated by the clinical observation that not as good results are obtained if the vaccine is repeatedly injected in approximately the same area as when an absolutely new area is selected for each injection. Some doctors even contend that better results are obtained by injecting vaccine in divided doses.

From these considerations it is evident that in bacterial vaccines we have an efficient absolutely safe biological remedy which is nontoxic when applied in the treatment of acute infections and which should be applied at the earliest possible moment in all acute streptococcus, pneumococcus and other pyogenic infections because by the early administration of the vaccine, the best results are obtained.

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The Dawn of Surgery

Notes from Homer

By JONATHAN WRIGHT, M.D.,
Pleasantville, N. Y.

There are still primitive men and still a few primitive men in primitive surroundings, but since the time when there were few civilized men there has been a curious decline in the social status of the practitioners of medicine. When they split off from the high priest and the chieftain of the clan, when differentiation, which is only another word for civilization, had advanced thus far they had their first and most serious loss of caste. It certainly did not help matters much, and on the whole neither did it make matters much worse when they split off from philosophy, so far as their social prestige was concerned, but when medicine was again broken up in the course of the growth of cities into minute trades and mechanical arts and connection with philosophy bid fair to be severed altogether, when the medical man had no time for the arts in their higher definition or science in its broader development, then serious degradation really set in for medicine and it is not to be checked in its downward course on the intellectual plane by group practice in our time either. It is not so much group practice the medical man needs as the grouping in his head of various cosmic and metaphysical, psychological facts and feelings in active communication with the materialistic unit whereby he gains his daily bread and an ephemeral reputation.

However, leaving at one side this critical epitome of the differentiations of the pursuits of men in their later manifestations, since the time of early primitive man when we find him in close union with or in a more or less equal rivalry with the heads of the state and the church the first fall from power and influence was the most serious. It is not necessary in this instance to turn to the ethnological notes of modern primitive life any more than to realize that this tendency for law, religion and medicine to dwell beneath the common shield of magic is all but universal among primitive tribes. The chieftains, kings and emperors have lasted until our time, even popes persist, but the medicine man as a potential force had an early fall and came long ago to an absolute loss of temporal power, somewhat resumed in our day by boards of public health. Kings and popes have come to the verge of it, but we still know them as politicians. With the exception of some Latin countries of the new world and our upstart health officers the medical man has no political power by virtue of his profession.

It was not always so even at the origin of our culture. In the *Iliad* of Homer we plainly perceive the affiliation of medicine with supreme power and Æsculapius as the son of Apollo had a high seat among the hierarchy. The physician in Homer is a hero and a comrade of heroes and yet we find on the wall paintings and in the encaustic work of vases and the etchings on less fragile material the physician almost in a menial position. In one of them, if we search out the one to which Daremberg alludes, (1) we see Menelaus represented of heroic size and Machaon small, deferential, looking up at him like a slave, but that is not the way Homer represents them at all. Arktinus, perhaps even a hundred years later than the author of the *Odyssey,* puts the surgeon in the second place and if nothing else, even as early as this, (775-740 B.C.?), we see the beginning of his drift towards the barber shop. "The earth shaking Neptune," Arktinus says in his poem on the ruin of Troy, "bestowed rich gifts on Machaon and Podaleirus, but he made one more honorable than the other. To the first he gave deft hands, shaped to draw the arrow from the flesh, to make incisions and to cure all wounds. He placed in the heart of the second, however, a marvelous sagacity for recognizing hidden disease and for curing desperate cases. It is Podaleirus and he was the first to discover the madness of Ajax by his blazing eyes and the melancholy of his temperament." For Homer it was Machaon that had the stage and the chieftains too dabbled in surgery. We cannot fail to see in this that though wounds and blows were the end of life and their treatment the ends of life for the doctor in Homer we begin to get the intrusion of philosophy in Arktinus and he starts the mechanics of medicine to the rear.

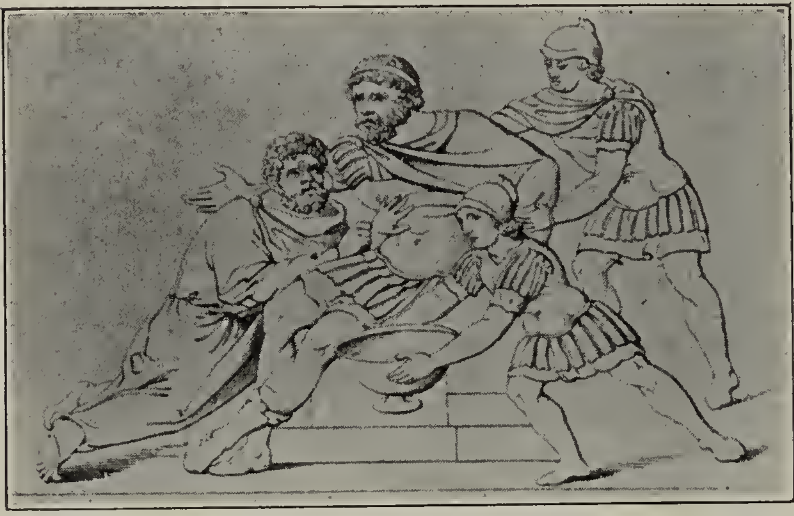
FIG. 1.—Diagnosis and treatment. (From the Greco-Roman period.)

By the time of Plato, though he speaks with respect of Hippocrates, we find him saying (2) the arts of the physician, like those of many other mechanics, are accounted vulgar. There seems less reason to think of their low social standing in the language Daremberg quotes from Plato's great predecessor and ancestor, but from this fragment of Solon's we can scarcely avoid seeing that surgeons were not so high in the world as when they associated with heroes and led their thirty ships filled with warriors to the siege of Troy. Solon speaks of it chiefly as a trade and of its triumphs as chiefly attained by the laying on of hands. Yet it was out of the chieftains of the Achains, skilled in the treatment of wounds, that grew the army surgeons of Xenophon, out of their tents grew the field hospitals that existed in the Roman army and very likely in earlier times still in the expeditionary armies of the Persians and the Greeks. Who the poet Eurypylus was or when and where he lived I do not know, but Athenaeus mentions him and Cicero (3a) quotes from him, referring to the old army: "The wounded fill the porches of the children of Æsculapius," and Eurypylus is speaking of the affairs of the Argives. Xenophon in the Anabasis refers to the army surgeons in a way that allows the inference they were no novelty in his day and he speaks elsewhere of Persian army surgeons, but one gets no mention of them in Herodotus, who says he lived four hundred years after Homer and he was himself older than Xenophon by forty years at least. Herodotus was well acquainted with doctors and has much to say of Democedes and others but nothing of the army doctors. We get little out of the *Odyssey* in the way of surgery. The scar of Ulysses, which betrayed him to his nurse on his return home, we learn resulted from a wound of the leg in his youth made by a wild boar's tusk and it was cured by the sons of Autolycus, who bound it up skilfully and stayed the black blood with a song of healing (XIX-455) which matches Solon's remarks on the laying on of hands. Now this is magic, but it is not the magic we find in the *Iliad.* How shall we mark the difference? Shall we say in the *Iliad* there is a higher grade of magic at work? In the *Iliad* we are still in that stage of the magic healing of wounds by the intervention of a goddess or a demigod, in the *Odyssey* of a fakir, yet we have too little material to base any such distinction upon, but I want to insist again, as I have done elsewhere, that the magic of Homer is our magic, the magic of the northland not of the dusky Mediterraneans. We have to come down to the century of Sophocles, a literal century, for he lived a hundred years and overlapped the birth and youth of Hippocrates, before we find a Greek writer speaking with disrespect of the medicine man's

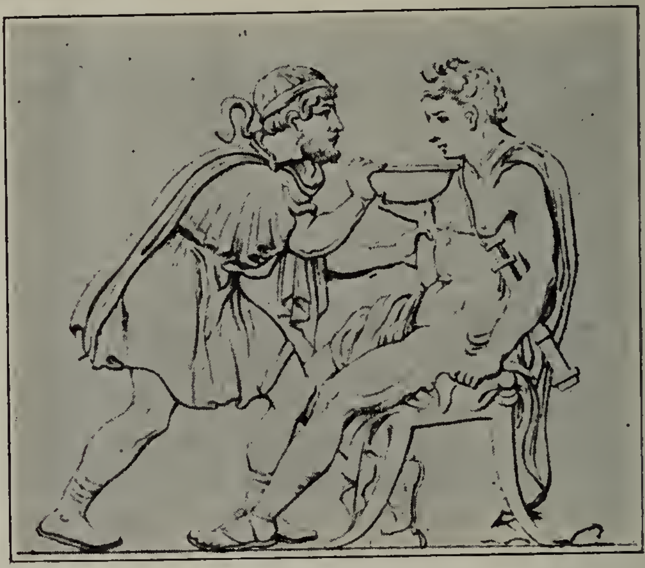
FIG. 2.—Nestor giving wounded Machaon a strengthening potion. (See Friedländer, Vol. I, 373.)

whining a song over a sore that calls for the knife. It must have been a respectable Æsculapius and his cult, even though he had his snake with him, whom Sophocles welcomed to Athens with an ode as high priest of the temple.

In the *Iliad* we find not only the two sons of Æsculapius physicians and warriors, but they were leaders, "the cunning leeches, Podaleirus and Machaon. And with them were arrayed their thirty hollow ships." (4a) It was Machaon to whom Lord Agamemnon called that he should look after Menelaus, captain of the Achaians, whom a Trojan or some Lycian archer had wounded with a bowshot, glorious for him but full of grief for the chief of men, his brother. (4b) It was said that Menelaus was wounded in the groin or thigh and the illustration, (Fig. I) said to date from the Greco-Roman period, may have been inspired by this passage in Homer of Machaon succoring him It is more than hinted in the *Iliad* that Menelaus had his failings and that fortitude was not one of his virtues and we know how his wife tired of him. Whenever this representation was executed, it was a period at least when obsequiousness to the aristocracy did not overcome the rules of art and Machaon has the same or practically the same physical proportions as Menelaus, if this is the scene it is meant to portray and in the sense of representing Homer s ideas of the army leech it is historically correct. From the golden haired Menelaus, wounded through the clasped belt, Machaon, the godlike hero came and drew forth the arrow, whose keen barbs were broken backwards as he did so. "Then he loosened the glistering belt and the kirtle of mail beneath and the steel thigh pieces, that the coppersmith fashioned and when he saw the wound where the bitter arrow had lighted, he sucked out the blood and cunningly spread thereon soothing drugs, such as Cheiron of his goodwill had imparted to his sire." Now it was because the arrow was poisoned it was bitter and because it was poisoned Machaon sucked the wound. The critics have good philological and other good reasons for thus interpreting the epithet applied to the Homeric arrows. "Bitter" was poison because it was herbs chiefly that were so used and these herbs were bitter. Among primitive men other poisons are known, it is true, but in the Babylonian dialects as well as in the Homeric usage the terms were interchangeable or closely associated. Thus Apollo probably used, in the thought of the original Homeric bard, poisoned arrows to spread disease in the Achaian fleet, and we as surgeons can see no reason why the son of Æsculapius sucked the wound, except that which moves the medicine man to do the same thing now in localities where poison for the arrow can be found. So we still treat snake bites in an emergency. The later Greeks were ashamed of this barbarian method of war in the bard they revered, more ashamed than we are of poison gas, and they deleted, it is insisted, such passages in the revised copies of Homer which were made at Athens, in the time of Pisistratus, or of Aristarchus in the time of the first Ptolemies at Alexandria, who, Cicero says, (5) refuses to attribute verse he does not like to Homer, marking with the obelisk and interpolating. Certainly by the time of Aristarchus and possibly as early as Pisistratus, the close affiliation of bitterness with poison, etymologically, had been lost. It has only lately been recovered by the philologists with the help of the archeologists and the ethnologists.

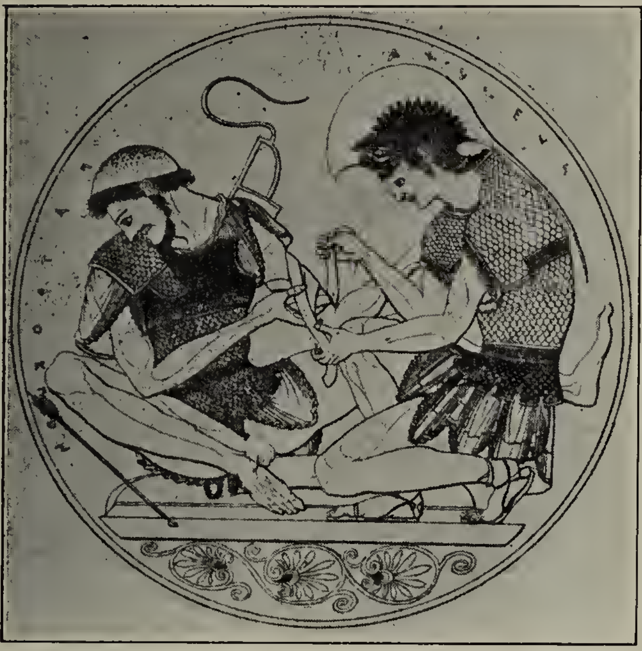

Fig. 3.—Achilles binding the arm of Patroclus. From a painting inside a vase.

Alexandros, Paris, lord of the fair tressed Helen, smote Machaon on the right shoulder with a three barbed arrow, (4c) and then it may be remarked that Nestor, doughty old warrior and true gallant as he was, had a maid servant whom he kept in his tent and Hekamede, the wise woman, who had her medical arts from Egypt, ministered to Machaon, whom Eurypylos had declared in need of a good leech himself. But the mess she mixed for Nestor's wounded guest, would hardly have been attractive even to the driest man in this dry epoch. Pramnian wine may indeed have been good, but why it should have been desecrated with goats' milk cheese, grated in a brazen grater, and barley flour sprinkled over

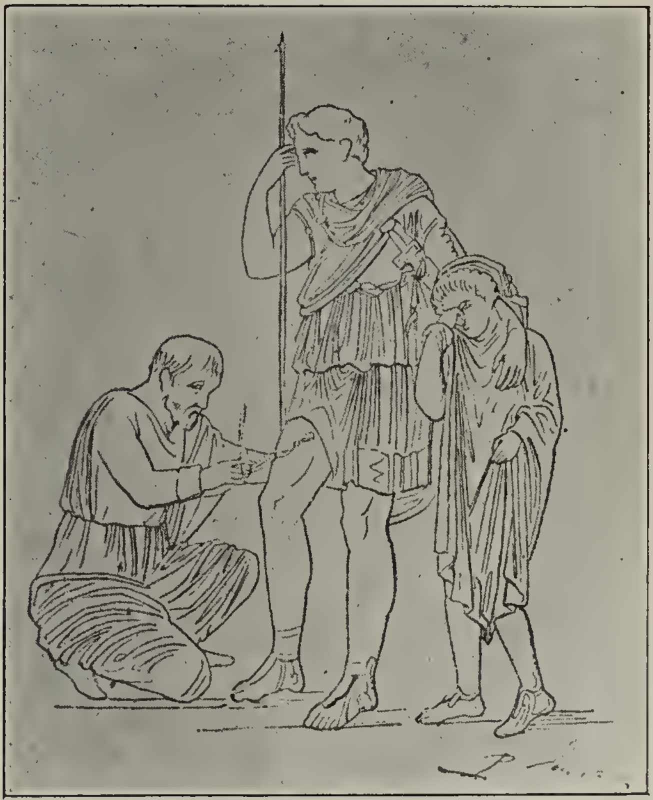

Fig. 4.—Using a forceps on a wound from a painting of Iasis and Æneas at Pompeii.

it, does not appear. Such a milk punch or high ball appeals neither to the modern dietitian nor to the modern inebriate. Though several books of Homer are passed over after Machaon got his wound before we meet with the group in the tent of Nestor the action is much more rapid and the fiery old gentlemen, when the cry of battle rose, could linger no longer, "albeit over his wine," and was off exclaiming to Machaon, "Nay, sit where thou art and drink the bright wine, till Hekamede of the fair tresses shall heat warm water for the bath and wash away the clotted blood." (4d) Wine and woman doubtless wrought a cure, but can we find any more sincere tribute to a noble guest than for Nestor to leave him with both? That, it seems to me, establishes at once the standing of the army surgeon at Troy, and that is the last we hear of Machaon in the *Iliad*.

This is also one of the incidents that fired the imaginations of later Greek artists. The loving cup of Nestor, according to Athenaeus, (5) was to be seen at Capua in his day, probably about as authentic as some of our own antiques, for Homer has told the copyists how to make it. "A right goodly cup the old man brought from home, embossed with studs of gold and four handles there were to it and round each two golden doves were feeding and to the cup were two feet below." We get a hint as to the size of a drink for those old warriors and deep trencher men, cast in the giant mould of demigods and heroes. "Another man could scarcely have lifted the cup, when it was full, but Nestor raised it easily."

It is not Machaon alone by any means who treated wounds, though the Homeric Eurypylus declared a leech worth more than many men. As has been intimated we find other chieftains practising surgery and we find the later Greek artists fully recognizing this in such work as has been preserved for us. Nearly a hundred years ago there was found in an Etruscan tomb at Volsci the socalled cup of Sosias and inside it was adorned, perhaps sometime in the IVth century before Christ, with a representation of Achilles putting a bandage around the arm of Patroclus (Fig. 3). The figure of eight bandage that is going on looks somewhat professional and there can be no doubt that Sosias had Achilles in mind as a medical hero as well as a warrior. He was the pupil of Cheiron and he taught Patroclus what he knew from him about wounds, as Eurypylus said when he came limping out of the battle, (4c) wounded in the thigh with an arrow, the sweat running in streams down from his head and shoulders and from his cruel wound the black blood welling, but he knew what he was talking about when he beseeched Patroclus. "Do thou succor me and lead me back to the black ship and cut the arrow out of my thigh and wash away the black blood from it with warm water and smear soft healing drugs thereover, these good herbs whereof they say thou hast learned from Achilles, whom Cheiron taught, the most righteous of the Centaurs." . . . "Patroclus sat in the hut of the kindly Eurypylus . . . and on his cruel wound was laying herbs to medicine his dark pain," but he like Nestor too was carried away by the rush of war around him, starting up and smiting his two thighs with his hands flatwise. "No longer may I abide with thee here, though great thy need . . . but thee let thy squire comfort while I hasten to Achilles that I may urge him to join the battle. (4e) The heroes fall in heaps and about them the leeches skilled in medicine are busy healing their wounds. (4f)

When Apollo struck Patroclus with his hand and rendered him senseless Euphorbus ran him through with a spear and Hector finished him, but where he got the wound in the arm we see Achilles treating I do not know. The roller bandage betokens a stage of civilization, to say nothing of medicine, which we are not accustomed to associate with Homeric Greeks and one would be surprised that it should have existed in the epoch to which one can conjecturally assign this vase of Sosias did we not know from Hippocrates himself in the Vth Century B. C., how bandaging like this was a fad among practitioners of which he made sport. As for Patroclus having a wound of the arm that may have been of record in a copy of Homer we no longer possess today or it may have been a story of those coming later living on the crumbs from Homer's table, as Æschylus said of himself, or still again it may have been an error of Sosias in the first place with his mind fired by the fad of his day rather than stocked with accurate Homeric lore. All these things may have been so, but more likely the reproduction has been so labelled by some much more recent copyist who also was imperfectly acquainted with Homer's account of the doings of Homeric heroes, but so far as I know, when Patroclus got that buffet on the ear from Apollo and the spear thrust in the back from Euphorbus and the knightly Hector gave him another in the belly as he saw him lying there in the dust we sum up all, and it is enough, we know of the wounds of the bosom friend of Achilles in our modern Homers. He was a much abused man, but that wound in the arm in the illustration is unaccounted for.

How easily errors creep into the interpretations of ancient works of art all the way along the line from the original artists through the archeologist and those to whom he furnishes material multiplied by the thousand on the modern press, copied from the one to the other until it arrives at the hand of the final chronicler, himself a weak and fallible agent in the dissemination of knowledge, socalled, is exemplified in another illustration (Fig. 4) which is fallen from its high estate on the walls at Pompeii into my humble hands, Iasis and Æneas. The latter was one of the few Homeric heroes, as is well known, who did not come to an unhappy and inglorious end. There are few modern readers of Virgil's immortal epic who do not often wish the same ill fate for the man who with imperturbable Roman vanity and arrogance told Dido, *"magna pars fui."* But for mother's help on many occasions he would never have lived to trifle with poor Dido and it is Venus's lovely self again who steps in in the XIIth book of the Æneid to do more than earthly hands could do for her sweet tiresome prig of a son, the ever blooming, radiant Venus born from the foam of the sea, where all life and much love begins. But "Iasis" was a bewilderment rather than a help to me in trying to find just where Æneas again needed his mother. By accident more than searching diligently, I stumbled on the line: (6)

> *Iamque aderat Phoebo ante alios dilectus Iapyx*
> *Iasides. . . . . . .*

It was Iapyx, the son of Iasis, who used the extracting forceps on Æneas, leaning in a very poor posture on his spear, discouraged, while Turnus rages across the field of battle in the distance seeking his foe until by divine help Æneas is healed from his chance arrow wound and the gods produce his enemy for his elaborately prepared *coup de grâce*. It is marvelous how the art of the poet has triumphed in the Æneid with Æneas in it. Here, however, it is for us to take note that the forceps are in use in the time of the very mediocre Pompeian artist and we got no mention of them in our citations from Homer. We may question the archeological knowledge of Virgil too, for the artist has his support in supplying the son of Iasis with a forceps *"prensatque tenaci forcipe ferrum"* (l. 404). The fates would still have been against Æneas, for even Apollo lent no helping hand, had mater Venus not floated swiftly through the air from Mount Ida, in Crete, not in the Troas, where she had once dallied with Æneas' father, and brought some dittany leaves and stem, with which the goats treated their wounds and with this help from Heaven Japyx got the arrow out and the hero healed in marvelous time.

Daremberg (1b) takes note of some of these things and attempts a collection of all Homer knew of anatomy, but it is a meagre showing for the great industry and philological knowledge displayed by the learned Frenchman. With these sterling qualities it is singular he seems endowed also with a remarkably vivid imagination and one, less gifted, soon perceives that fewer anatomical notes accumulate as the result of an independent search. Most of our names for the regional anatomy of the surface of the body are derived from those of Homer, otherwise the anatomy of Homer is minimal. From him we have our words pharynx, phlebotomy, tarsus, stomach (only it was not exactly the stomach) stoma, sternum, cardiac, ischium, neural, derma, gastric and a large number of other terms, but it was left until comparatively recent times to associate any exact meaning with them. They are a part of our language, of all modern languages, like the vast body of our scientific terms, absurdly uncouth some of them, but all coming from the Greek, which some insensate men are attempting to obliterate.

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3. CICERO:
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   b. Epist. ad fam. III x 5...IX x 2.
4. For the most part I avail myself of Butcher and Lang's translation of Homer:
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   b. IV, 193.
   c. XI, 506-635-833.
   d. XIV, 3.
   e. XV, 390.
   f. XVI, 28-795.
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John Owen's Epigrams on Medicine and Medical Men

By WILLIAM RENWICK RIDDELL, LL.D., F.R.H.S.,
Toronto, Canada.

There never has been a time when medicine and the medical profession were exempt from quips and slurs, humorous or serious, and ranging from merry banter to savage satire. John Owen (1560 ?-1622), a Welshman, wrote many epigrams, among them a number on the medical man and his art; and it is the purpose of this paper to copy a few of his epigrams of that kind. Owen was educated at Oxford where in 1590 he took the degree of B. C. L. (1): he spent most of his life in teaching: he called himself Joannes Audenus (2).

The epigrams are Latin elegiacs, and are of different lengths—most of them consist of the one couplet of one dactylic hexameter and one pentameter; others, having more than one of such couplets—I find one with eight, others six or five. The Latin is perfect (*Sapuerunt* in Lib. II, 10, is probably a misprint), the metre, good (unless an occasional hiatus be considered a blemish) and the rhythm exceptionally excellent. Eleven books containing 1,635 epigrams were published in Owen's lifetime: there are in my edition a twelfth book and some disconnected verses, published posthumously, 1.777 pieces in all.

He was an inveterate punster, made an occasional anagram (3), had some wit and much sense of drollery. These epigrams have been translated into English, French, German and Spanish; and the Latin text has been frequently republished. My own copy has the date 1819 stamped on the back; but it bears internal evidence of having been printed long before. No profession or class escapes Owen's pen: but in this paper, only epigrams concerning medicine or the medical profession will be noticed.

The translations are wholly my own—they aim to give the sense of the original and are as literal as that object and the idioms of the two languages permit: they have no other merit.

The first epigram I copy contains the prehistoric but ever new jibe that "the cure is worse than the disease." Perhaps Hood's Jack Hall expresses the thought most tersely:

> In fact, he did not find M.D.s worth one D—n.

But let us listen to Audenus, Lib. I, 20—

TO A CERTAIN NOBLE YOUTH

Everyone wishes long life to you, no one death;
Disease not medicine is desired for you.

(The Latin saying was: *Plus a medico quam a* *morbo periculi,* More of danger from the doctor than from the disease.)

Here fits in a posthumous epigram, Supp. 56:

TO CYNTHIUS

Six mortal diseases tortured me, Cynthius;
Worse than these six is the seventh, the Doctor.

The next two are characteristic of the times when purging was an almost universal practice—not a bad one, by the way, when people overate as well as overdrank so tremendously. (Lib. IV, 199.)

GOLD FROM ORDURE

Virgil drew gold from the ordure of Ennius:
Virgil, did, what the doctor does too.

Chaucer's

"doctour of physike
In all this worled ne was ther non him like
To speke of physike and of surgerie
. . . .
. . . knew the cause of every maladie
Where it of cold or hote or moist or drie,
And wher engendred and of what humour
He was a veray parfite practisour;" but, of course,
"For gold in physike is a cordial
Therefore he loved gold in special."

Owen's other epigram is not so classical. (Lib. XI, 23.)

GOLD FROM ORDURE (4)

The contractors for the public jakes gathers gold from Ordure, (5)
And two others, the farmer and the doctor.

The folly of the quest for the "Philosopher's Stone" is hit at in the next. The seekers were almost invariably physicians. (Lib. II, 9).

AGAINST THE CHEMIST

The Chemist boils inert matter when he is boiling gold,
And he wastes all his substance for *the Stone.*

It is an extraordinary fact that even intelligent people will cast up to members of the medical and other professions that they make money—why in earth should they not? (Lib. I, 21.) (Lib. I, 53.)

TO A CERTAIN POOR PHYSICIAN

You who but the other day came to our city a Mendicant, (6)
With a slight change of name have become a Medico.
You give the sick man drugs, the sick man gives you gold;
You cure his disease, he yours:

THE DOCTOR

The doctor takes gold offered, he is not accustomed to give it;
The doctor gives drugs, he is not accustomed to take them.
It is proper for the doctors Ordonner, for the sick Or donner,
So each thing demands the help of the other.

The English proverb has it, "The physician owes all to the patient but the patient owes nothing to him but a little money." In this, however, "owes" has the subjective meaning of duty, i. e., "owes all" means "has the duty in all respects." In that sense only is the proverb true. (Lib. I, 113.)

THE SURGEON

Whether should one pray for war or for peace? Either serves me:
Both Mars and Venus are patrons of mine.

Venus according to old John Gower

"is the source and welle
Of wele and woe" . . . (Confessio Amantis)

How she is a patron of the surgeon appears from the text (Lib. I, 114):

THE LUES VENEREA

Italy is my native land (7), my parents French;
The Frenchman is in doubt, let the Italian speak.

Perhaps the following contains a bitterer satire. Who Cinna was, does not appear (Lib. V, 86.)

TO CINNA, A PHYSICIAN

You know how to kill diseases: and how? you kill the sick, too.
What you do, Cinna, like Judas you do quickly; (8)
Him, who is your patient, oh thrice and fourtimes blessed man.
You do not allow to suffer from *long* illness.

Bacon's "Cure the disease and kill the patient."

Old Samuel Garth was not more sarcastic when in the dispensary he assailed the practitioner:

The patient's ears remorseless he assails
Murders with jargon where his med'cine fails,

adding.

While others meanly asked whole months to stay,
I oft dispatched the patient in a day.

The following is a different form of the better known description of the change of rôle of the doctor (9) (Lib. V. 95).

THREE-FACED ÆSCULAPIUS

The face of the attending doctor seems to be threefold
To the sick one—that of a man, a demon and a god.
When the doctor first comes in and salutes him,
The sick one says, See here comes God or my guardian Angel!
When medicine has put disease to flight he cries, There's a Man.
When the doctor asks for his pay, Get thee hence, Satan. (10)

Hence the sage advice to the medical man *"accipe dum dolet,"* "Get your fee when he is sick."

If the doctor cannot give anything else a prescription is in order—nowadays more than ever—and the cabalistic ℞ Owen thinks is "Recipe," as no doubt it is, whether or not it is also an invocation to Jupiter. (Lib. I, 161.)

TO PONTICUS

Having promised several things, Ponticus, you give me nothing;
Just as a doctor although he gives nothing, says *Recipe.*

And George Colman in his Lodgings for Single Gentlemen tells us:

But when ill indeed
E'en dismissing the doctor don't always succeed.

No sager advice was ever given than that celebrated *Gnothi Seauton, Nosce teipsum;* the invisible part of man is just now beginning to receive study by the medical profession. (Lib. V, 79.)

KNOW THYSELF

Let Ethics be added to Physic if thou desirest to know thyself;
This teaches the anatomy of the body, that of the soul.

Dietetics is not new: the famous School of Salerno in its Maxims said:

If Physicians fail you, let these three be your physicians,
A merry mind, quiet, moderate diet.

Just our proverbial "Dr. Diet, Dr. Quiet and Dr. Merryman." (Lib. II, 168.)

CONCERNING DIET, TO I. H.

If you wish to grow old slowly, you should use
Either moderation medically or the medico moderately:
Medicine taken injures health just as food does,
And food taken is as healthful as medicine.

The same thought is somewhat differently expressed in the next epigram to be quoted. (Lib. III, 57.)

INTERFERENCE

We who desire to lengthen the span of this fragile life,
Why do we shorten the way of life by luxury?
We do not and we do wish the period of life to be lengthened;
We do not wish that to be done by ourselves: we do, by doctors.

Dryden puts it thus:

The first physicians by debauch were made,
Excess began and sloth sustained the trade.
. . . .
The wise for cure on exercise depend
God never made his work for man to mend.
And plain living gives health and long life.

Lib. XI, 34.

NATURE CONTENT WITH (or full of) WHOLESOME FOODS. (11)

Do you wish to be fit? That is easy, for in stores of bread and water
Whoever wishes may be very rich.

Some medical man called "Celsus" (12) by Owen, seems to have been a better trencherman than wit. Suppl. Ep. 68.

TO CELSUS

The platters set forth tasty food, grateful to you,
And your table bears no insipid food.
But in you; there is nothing tasty, no (Attic) salt, (13)
Your platter, I think, is more tasty with viands than you.

"Celsus" does not seem to have been too sympathetic. Suppl. Ep. 69.

TO CELSUS CONCERNING HIS (14) GOUT

That gouty pain keeps me from the temple, Celsus,
Do you, smiling, venture to call it laziness?
But be it laziness, that is pardonable;
I wish that your laziness would pain you as much.

Supp. Ep. 70.

TO THE SAME

That held by the feet, I am obliged to take to my bed
Is no evil, Celsus: but mere laziness is.
But is not the sloth preventing you from going to the temple
The avarice from giving, gout both of foot and hand?

Dr. Paulinus was worse than Celsus or Cinna. (Lib. I, 44.)

TO DR. PAULINUS

Why is your sick man, Paulinus, called your *patient,*
Although he may be *impatient* of the disease and of you?
Because he suffers from you, he is called your *patient,*
For the doctor tortures him more than the disease.

But Cinna is bad enough. (Supp. Ep. 77.)

CONCERNING CINNA

Compact breaking Cinna is always wanting me to play with him.
I don't do it, for play also has rules.
There are worse things than gout in life.

Lib. I, 108.

ABOUT COTTA

When Cotta, the other day went into the warm lupanar,
He is said to have gone home, *re infecta* (15).

Lib. I, 127.

TO COSTUS

You sin with impunity but not your mentula; the other day,
Cauterized, it suffered decapitation (16).

Lib. I, 136.

TO PINOTUS SUFFERING WITH COLIC

If you had not breathed out your soul, (17) Pinotus, you would have died;
What is death to others, that was life for you.

Lib. IV, 227.

TO D. C. G.

Gout and the disease the opposite of gout, both trouble you;
Your wife makes you run, the gout makes you stop.

Health does not come from drinking healths—not to the drinker—for, as Jerome says, "We drink one another's health and spoil our own"—nor to the toasted. (Lib. VII, 14.)

WHOLESOME ANAGRAM

I wish to you much, I drink to you no health:
More effective is dry health than health drunk.

"In the multitude of counsellors there is safety," says the Wise Man: but "too many cooks spoil the broth" and "doctors differ." *"Dum medici consultant moritur æger."* "While the doctors are consulting, the patient dies." The Emperor Hadrian on his death-bed kept saying that the multitude of physicians had killed him: the old Greek epitaph has it: "the visits of many physicians have killed me," etc., etc.

But Owens puts it rather neatly (Lib. XI, 69):

THE SICK ARE NOT CURED BY NUMBERS

Believe me, a sick man will never be cured of a disease
If one fever is trusted to many physicians.

Owen is fond of comparing the legal and the medical professions, and of taking a fling at both. Sometimes, theology is brought in and fares worst of the three. (Lib. V, 11.)

THOU SHALT NOT KILL: THOU SHALT NOT STEAL.

Thou shalt not steal: this law is written for the lawyer;
This one, Thou shalt not kill, belongs to the doctor.

Arthur Clough's version of "Non occides" in his "The Latest Decalogue" may be cited:

Thou shalt not kill: but need'st not strive
Officiously to keep alive.

Lib. VIII, 3.

THE LAWYER AND THE DOCTOR

Unless the former be crafty, unless the latter be venturesome,
Both may feed themselves on begged food.

Lib. VI, 47.

THE DOCTOR AND THE LAWYER

Galen gives wealth, Justinian gives honors,
So long as the latter is not a patient, the former a client.

Lib. I, 15.

TO DOCTORS AND LAWYERS

You, Galen, are efficient in respect of our ulcers,
You, Justinian, are wise in respect of our folly.

Lib. I, 71.

KINSHIP OF DOCTORS AND LAWYERS

Lawyers and doctors stand on the same footing:
What hurts others is legitimate gain for them:
These to the ills of the sick, those to litigation over fields
Give careful assistance while they make themselves masters of the money (19).

Tacitus says, "The physician is superfluous among the healthy"; but Owen shows how to be *"sanus"* in every sense. (Lib. III, 123.)

MEDICINE AND LAW

If mortals were willing to live according to nature,
There would be no need of the assistance of Medicine.
If men were wise and they would avoid quarrels and greedy lawsuits
And the fustian eloquence of the querulous Court,
Then the ill-arranged Bartolus (20) would go behind the bookcase,
And the mouse would gnaw Hippocrates no longer read.

Brougham defines the lawyer "as a gentleman who rescues your estate from your enemies and keeps it to himself": Owen has quite as poor an opinion of both lawyer and doctor. (Lib. VIII, 36.)

FROM BAD TO WORSE

(Out of the frying pan into the fire.)

He falls into Scylla seeking to avoid Charybdis, (21)
Who fleeing the disease, falls into the hands of the doctor.
The foolish while they shun certain evils fall into the contrary ones.
Who flee a lawsuit and consult a lawyer.

In the following there is an amusing play on the two words spelled and pronounced the same: "Jus," law, private right, and "Jus," broth, infusion, our "juice." (Lib. V, 50.)

AMBIGUOUS "JUS"

The lawyer and the doctor are both skilled in "Jus,"
The latter saves the sick, the former estates by "Jus."
The lawyer has learned to give to each client his own particular "Jus." (22)
The doctor to the sick man his own particular "Jus."
How does the "Jus" of the lawyers differ from the "Jus" of the doctors,
Do you ask? That is dry, this is wet.

Now we are introduced to the theologian who along with doctor and lawyer rule the world, as did Jupiter, Neptune and Pluto, the three sons of Saturn. (Lib. I, 131.)

THE THREE SONS OF SATURN

Untrustworthy theologians (23), lawyers deliberate and crooked,
Filthy doctors—by these is the world governed.

The two Roman Triumvirates of Julius Cæsar, Pompey and Crassus, and of Cæsar Octavianus, Antony and Lepidus, are recalled by these three all-powerful classes. (Lib. X, 80.)

THE TRIUMVIRS

The physician lives intemperately, the lawyer as an outlaw:
Who are the theologians? Nothing but divine Words.

The theologian is not in good odor, notwithstanding the importance of his sacred office. (Lib. IV, 194.)

TRIUMVIRS

Clients think well to go to the lawyer:
Why, unless they think wealth the greatest good?
The sick man sends for the doctor when confined to bed:
Health of the body is the second care of men.
The theologian who should be the first to be sent for for the sick,
Comes last—but he *comes,* even if nobody sends for him.

Good advice is always in order. (Lib. IV, 226.)

THE THREE CONFIDANTS

The whole story should be told of a lawsuit to a skilled lawyer,
To the doctor, the disease; to the priest, the sins.
You who wish to save your money, soul and body,
Conceal nothing in life from these three.

This advice is proverbial in English, French, German and Italian—probably in other languages. The Italian runs:

Al confessore, medico e avvocato
Non tenere il ver celato.

Lib. X, 67.

THE THREE RULERS OF THE WORLD

Let the clergyman be wise that he may be all things to all men:
Let the lawyer be prudent and the physician skilful.

In Adam's fall
We sinned all.

the New England Primer says: John Owen puts it thus (Lib. III, 45):

ADAM'S FALL

Adam's fall subjected the soul to the theologians,
And the body to the doctors and estates to the lawyers.

Perhaps the following goes beyond the legitimate bounds even of satire (Lib. IX, 26):

CHRIST, THEOLOGIAN, PHYSICIAN AND LAWYER

Having exercised the function on earth of theologian and physician
In Heaven He will perform the duty of Judge.

Old Galen is treated with respect. (Lib. VI, 49.)

ANAGRAM GALEN, ANGEL

Whether are you a good or a bad angel, Galen?
Guardian of human health, therefore a good Angel.

When physicians are mentioned by name, they are spoken of in high terms. (Lib. VII, 65.)

TO THEODORE DEODATUS (24), PHYSICIAN

You are the Gift of God in your Greek and your Latin name:
Skilled in the art of Apollo, you will be thrice the Gift of God.

With all his satire, it is obvious that Owen had a higher opinion of the Medicine of his day than Bacon who in his celebrated *Advancement of Learning* (1623) said: "Medicine is a science which hath been . . . more professed than laboured, and yet more laboured than advanced: the labour having been, in my judgment, rather in circle than in progression." Owen highly praises another medical man. (Lib. IV, 250.)

TO WILLIAM BUTLER, CAMBRIDGE PHYSICIAN (25)

Let others seek their gains to the neglect of health
You despise the delights of gain; your care is Health.
With you as physician, no one despairs of health lost—
Just as though medicine were your own discovery.
I speak truth of you, I do not flatter you as the patient is wont to do,
Praise does not come to you, William, from the insane.

Lib. III, 197.

TO JOHN GIFFORD, MOST SKILFUL DOCTOR OF MEDICINE (26)

That you should be skilled in the art of Apollo, Gifford,
Is not to be wondered at: you know your own body.
This, indeed, Galen does not direct but the learned Apollo
Demands it! Gnothi seauton was Apollo's precept (27).

And so we leave old Joannes Andenus, latinist, civil lawyer, teacher and epigrammatist.

NOTES.

1. This required a course in the Civil Law, i. e., the Law of Rome.

2. When every scholar wrote in Latin, a Latin or Greek form was given to rude names without classical form, e. g., Gerhard Gerhards became Desiderius Erasmus; Schwartzerd, Melanchthon, etc. It is probable that the absence of the letter w from Latin induced Owen to use the consonant d, but he writes *Walliæ* for Wales, etc., without regard for classical orthography.

3. In his time and for long after, a favorite literary amusement. Owen had not William Combe's aversion to the pun.

But still a pun, I do detest
'Tis such a paltry humbug jest
They who've least wit can make them best.

Possibly the best pun in the English language is that of Burke on the name of his friend and fellow student in Kildore, Dr. Richard Brocklesby. Greeting him as Dr. "Rock" and asked why, he said: "I can prove it by Algebra: Your name is Brock—b (Brock less b) which equals Rock," i. e., Brock—B=Rock.

4. *Aurum in stercore quaerere*—to seek for gold in ordure was a familiar postclassical apothegm. See, e. g., Cassiodorous, Inst. Divin. Liter. I., 510. Ennius, born 239 B. C., the first great Latin poet—even in the time of Cicero he "was considered the prince of Roman song. Vergil was not ashamed to borrow some of his thoughts and not a few of his expressions." Ovid, Tristia ii, 424, calls him: *"Ennius ingenio maximus, arte rudis."* His works are believed to have been extant as a whole as late as the 13th Century; now, but a few fragments remain.

Tiberius Claudius Donatus in his Life of Vergil says, "Vergil when once he had Ennius in his hand, being asked what he was doing, said that he was gathering gold from the ordure of Ennius."

5. Our ordinary Latin-English dictionaries are very prim about this word "forica," e. g. Andrew's Freund translates it by office, warehouse, taking the old Scholiasts' view in the Scholia on Juvenal, Satires, iii, 38: but there can be little if any doubt that Facciolati is right in giving the meaning—the place into which we cast faces; and it seems to be properly used of a public closet, as *laterina* of a private one. The "conductor" was the contractor who rented them from the city: he sold the ordure for manure "ad Rusticos."

Juvenal, Sat. iii, 37, 38.

. . . . .inde reversi
Conducunt foricas . . . .

Juvenal lashing the low politicians says that they used to blow the horn at shows, but now they "farm the jakes" built for the accommodation of the public, upon payment of a trifle. *Conductio* is a well known word in the Roman law.

6. Mark the play on words—Mendicus, Medicus.

7. Though it is almost if not quite certain that sypilis had its rise in Europe from Italy, it was generally known as Morbus Gallicus, French Pox, etc., etc. Frascastorio, who invented the word Syphilis, called the disease Morbus Gallicus.

8. Jesus said to Judas *"Quod facis, fac citius,"* St. John, XIII, 27 (Vulgate).

Dr. Sir Samuel Garth perhaps had Owen's Epigram in mind when he wrote of his confrère and enemy, Dr. Sir Richard Blackmore, who wrote verse of a kind and whom Garth addressed as "the merry Poetaster of Sadlers' Hall in Cheapside."

Unwieldy pedant, let thy awkward muse
With censures praise, with flatteries abuse:
. . . .
The feeble satire ne'er can do him wrong
Thy poems and thy patients live not long.

9. There are several epigrams to much the same effect. I have before me an Italian epigram: it is however almost identical with and probably a translation of the best-known Latin *Sal Atticum.* Pope says: "While Roman Spirit professor of Medicine in Marburg, was the author of the wellknown epigram:

Tres medicus facies habet: unam quando rogatur,
Angelicum: mox est, cum juvat ipse, Deus.
Post, ubi curato poscit sua praemia morbo,
Horridus apparet, terribilisque Sathan.

The physician has three aspects: the one, that of an
Angel, when he is sent for: shortly afterwards, God
When his medicine is working—afterwards when he asks pay,
The disease being cured, he appears a repulsive and fearful Devil.

Cordus is probably better known by his paternity of these elegiacs than of Valerius Cordus (1512-1544) the discoverer of sulphuric ether and the author of the first Official Dispensatory.

10. *"Tunc dicit ei Jesus: Vade Satana."* St. Matt., IV., 10. Owen drops the last syllable of Satan's name that the word may fit into the pentameter.

11. A pretty ambiguity—*contenta* may be from *contendo* and mean full, tense; or it may be from *contineo* and mean contented, satisfied.

12. Of course from A. Cornelius Celsus, the celebrated Roman physician and medical author of the Augustan times.

13. *Salitus* properly means sprinkled with salt, but like *salsus* it was used in the sense of acute, witty, facetious; *sal* was wit as well as salt, and we still speak of Attic salt, Latin verses of Cordus. Euricius Cordus (1486-1535), charms and Attic Wit," and the old Greeks said. *"Halme ouk enestin auto."* There is no salt in him.

14. i. e., the author's not Celsus'.

15. An exquisite pun, because so atrocious; *re infectâ* means the matter unfinished, or without having transacted the business, here it means, with the thing (*id est mentula*) infected. The ambiguity of *infectus,* unfinished or infected, is found in Latin—it arises from the double meaning of the prefix "in," not or into.

Calidum is not applied to the brothel as indicative of the physical and pathological condition of the inmates, not so much hot as "fired," the language is borrowed directly from Juvenal's famous Sixth Satire in the description of the vices of Messalina.

16. *Supplicium capitis* is capital punishment—Caesar's *capitis poena,* Bello Gallico, VII, 71.

17. *Anima* in its primary sense means air; it is only metaphorically the soul or spirit; the pun is obvious.

18. J. C. is *Jurisconsultus,* properly Consulting Counsel —but used by Owen for Lawyer generally.

19. Note the puns—*aegrorum, agrorum; opem, opum; patienter, potiantur.*

20. A well known commentator on the civil law of Rome; he was of almost equal authority with the text of the Institutes of Justinian itself. He lived 1314-1367, and was professor of Civil Law at the University of Perugia. Owen having taken the degree of B.C.L. at Oxford must have been familiar with Bartolo's works.

Hippocrates is, of course, the Father of Medicine, read by physicians almost till our own day. It is said that the celebrated Dr. Richard Mead first recommended himself to Radcliffe by his answer to Radcliffe's surly remark when he found Mead reading Hippocrates in the original—"I never read Hippocrates in my life," said the blunt Dr. Radcliffe. "You, sir, have no occasion. You are Hippocrates himself," was Mead's courtierlike reply.

21. *"Incidis in Scyllam, cupiens vitare Charybdim"* is a line from some unknown medieval writer founded on the adventures of Ulysses in the *Odyssey*.

22. "The maxims of law are these: to live honorably, to hurt no one, to give every one his own."—Justinian's Institutes, I, 1, 3. "Justice is the constant and perpetual wish to give every one his due," do., do., I, 1, 1. Cicero in his Oration against Verres has the double pun *Jus Verrinum,* hogbroth or the justice of Verres.

23. The form *Theiologus* with the lengthened first syllable is used instead of *Theologus,* as the latter with three successive short syllables would not fit into a dactylic hexameter; when the exigencies of the verse do not require it, the form *Theologus* is used by Owen.

24. I do not know this Deodatus. There was a Claudius Deodatus, a bishop and physician in ordinary at Basel about 1629; he was a follower of Paracelsus. Deodatus in Latin and Theodoros in Greek both mean Godgiven.

25. William Butler (1535-1618), born at Ipswich (not in County Clare, Ireland, as Bass has it, *History of Medicine,* Am. Edit., p. 395, n. 1), educated at Clare Hall, Cambridge, graduating M. A. He did not take his M. D. but practised with extraordinary success; he attended Henry, Prince of Wales, in his last illness, and was held in great esteem by his father, King James I. See D. N. B., VIII, p. 90.

26. Dr. John Gifford seems quite unknown to fame.

27. Apollo, who in the words of Byron (Childe Harold) was

> The Lord of the unerring bow,
> The God of life and poesy and light.

was also the God of the healing art and was called the father of Aesculapius—no doubt, a poetic and mythical statement of the wholesome effect of the sunlight (for beyond question, Apollo was primarily the Sun).

Medical Germany

By M. R. ROBINSON, M.D., F.A.C.S.,
New York.

For the past fifty years Germany has occupied the centre of medical activities, and has attracted students from all over the world. What has made Germany the beacon light on the road of medical advance for more than half a century? What powers and forces are still maintaining for it this unique position? Why did the Americans of the past as well as those of the present go to Germany for postgraduate study, in the face of our wealth of material and our magnificently equipped hospitals?

For the Americans, this question has been succintly answered by George P. Muller (1), when he said: "Postgraduate study in America does not exist; it must be created."

It is indeed a healthy sign to see our leaders admit that something is wrong with our medical education. Our country is undoubtedly endowed with all the potentialities of becoming a medical centre worthy of the world's recognition; if only our leaders could be aroused to a keener sense of their duties and responsibilities. Americans have contributed epoch making achievements to surgery, to gynecology, and within the past decade, to biology, biological chemistry and embryology. But all these achievements were the products of isolated and individual effort. Such work has the tendency to flash our scientific horizon, from time to time, but lacks the constant glow of collective and systematized endeavor. To foster creative work, to stimulate investigation, and to enhance research, we need collective effort, so that the scientific threads picked up by one group may, without interruption or unnecessary loss of time, be taken up by their successors and woven into the fabric of medicine.

After a sojourn of nine months in several of Germany's leading medical clinics, I feel it my duty to record my impressions, hoping thereby to contribute towards the arousing of the creative spirit, so that our institutions may in the future offer to the graduates in medicine that which has been denied them, or rather, which was impossible to give them during their undergraduate period.

I shall endeavor to omit from this report as much as will be consistent with accuracy, that is, the purely academic problems of medical instruction, and devote my time to the consideration of the undergraduate methods of teaching as they are, of the teachers, of the atmosphere in which our art and science is being taught, and of the relationship that exists between the undergraduate and the postgraduate medical development and growth.

THE CHARITE.

The first thrill that sets the medical soul vibrating, as one approaches the Charite is the Virchow monument. It represents *Health* and *Disease* engaged in a fierce struggle for supremacy, in the form of two gigantic figures. The former succeeds in subduing the later with a strangle hold. Beneath these figures is a white marble relief of Virchow bearing the inscription of his full name, nothing else. This monument is impressive in its simplicity and truly represents the life and the work of the great master; who has linked theory with practice and has given to clinical medicine its true scientific impetus.

To the right of the main gate of the Charite stands the most artistically executed lifesize bronze figure of Albrecht von Graefe. Holding the ophthalmoscope in his right hand, he gazes upon two groups of people, with a mingled expression of sadness and gratification. The figures to his right are partly or completely blind and are praying for the restoration of their sight, while those to the left of him give mute though eloquent expression of their gratitude for the help already obtained. The inscription on this monument, excerpted from William Tell, is so appropriate and striking that it is worthy of repetition, it reads:

> O eine edle Himmelsgabe ist das Licht des Auges,
> Alle Wesen leben vom Lichte, jedes gluckliche Geschoepf,
> Die Pflanze selbst kehrt freudig sich zum Lichte.

Once within the gates of the Charite, the visitor finds himself in a labyrinth of buildings occupied by the various medical departments. The thrill first experienced, gains in intensity as one continues rambling amidst the galaxy of medical celebrities whose statues adorn the paths and buildings: Friedrich Althoff, von Leyden, Traube, Orth, Griesinger, Westphal, Bardeleben, König, Langenbeck, Schroeder, Robert Koch and Emil Fischer. Many more, too numerous to mention, could be added to this list, without running the risk of having included one not worthy of occupying a niche among the immortals in medicine.

From the artistic side, which embellishes and enriches the sphere of life, let us now turn to the scientific part and observe how full grown to their tasks the high priests and prophets within these temples of medicine are, and to what extent they live up to their traditions.

PATHOLOGY.

Biology, biological chemistry, physics and higher mathematics have of late contributed much towards the solution of some problems concerning body functions in health and in disease. But for a long time to come, morbid anatomy will still continue to predominate as the science of abnormal physiology. The significance and blessings of pathological study are summed up in an inscription over the door leading to the autopsy rooms, it reads: *"Hic locus est ubi mors gaudet succurrere vitæ!"*

Lubarsch and his associates, among whom Ceelen ranks highest, direct this department. The material is abundant, the autopsies complete, and the methods of teaching thorough and superb. What these teachers are aiming at is to correlate postmortem findings to clinical phenomena. They do it in so vivid, so clear, so convincing and stimulating a manner, that the student is bound to carry away with him deep and lasting impressions. Pathology thus becomes part and parcel of the whole subject of medicine, and the clinician at the bedside is prepared to have a mental picture of the structural changes that have taken place in the organ or organs which he is treating. This form of teaching pathology also serves as a lesson of the dangers that lurk in partial autopsies, and how erroneous their interpretations may become. In these schools the undergraduate is given abundant opportunity to lay a solid foundation for his immediate medical education and to rear upon it a creditable edifice if he so desires.

INTERNAL MEDICINE.

In the Berlin University this department is under the leadership of three heads, who in order of their importance seem to me to be Kraus, Hiss and Goldscheider. Their methods of teaching are chiefly clinical in nature; there are no prepared or set lectures which are being ruminated from year to year with but slight variations in the cud. The clinical material at hand forms the basis and the theme for the days' instruction. The patients are brought into the lecture room and the professor begins to analyze and discuss the given maladies. As he proceeds to unfold the clinical data, nothing that is of scientific value and theoretical importance is omitted. Every effort is being made by the teachers to make the student visualize the knowledge that is being taught through all the aids and devices that the human mind is capable of inventing.

This is the prevailing plan of instruction adopted by all the departments, so that the student receives his knowledge of the various medical subjects not as separate and independent fragments of science but as coherent and allied parts of one entire medical whole.

Not until now have I fully grasped the meaning of the word school or *Schule* in the German academic sense. In Germany a school is designated as such, not because of its geographical distinction or method of endowment, but because of its own form of creative thought which it radiates under the guidance and inspiration of its leader. It is therefore not unusual to find in the larger universities more than one so-called school in one department. The advantage of such a system is to give the student a broader viewpoint of medical knowledge and to encourage him to seek information from various sources. Here are some of these fountain heads of medical learning.

Kraus is a venerable sage, orator and scholar! How imperceptibly does he merge old well known physiological and pathological facts into the most recent advances in the realms of colloid chemistry, metabolic disturbances, dysfunctions of the autonomic or the endocrine systems. Whether he teaches the principles of percussion and auscultation, or speaks about the disorders due to calcium and potassium disproportion in the animal economy, the same thoroughness, ease and facility are noted. At times Kraus mounts to medical heights which very few can ascend, and from which he alone can, so far, see the medicine of the future. Such a form of teaching is necessary. For the function of universities is not only to prepare the hewers of wood and the drawers of water, but also those who aspire to walk the higher paths of medicine.

Hiss clings more to the practical side of medicine and teaches the more positive things. In the course of his instruction, he displays an amount of knowledge so vast and universal in extent, that the listener becomes spellbound and is rapt in attention and admiration.

Goldscheider is the living exponent of the Senator school. He emulates his master in thoroughness, keen power of observation, and great clinical intuition. Goldscheider is the most popular lecturer in medicine. His feet are always on the ground, he appeals to the minds of the average student, and tries to impart the most useful knowledge in the most assimilable way. He deals with facts; his questions are direct, to the point and the answers always follow in logical sequence. He belongs to the class of clinicians who rely more upon their own power of observation than upon the modern scientific diagnostic aids. This, however, does not imply that Goldscheider lags behind scientifically, rather, does he accept scientific innovations deliberately and carefully after they have been critically weighed in the scales of clinical experience.

GENERAL SURGERY.

There are two surgical clinics in the Berlin University, conducted respectively by Hildebrand and Bier.

Hildebrand represents the type of surgeon which is rapidly disappearing to the great loss of clinical medicine; he is not merely a mechanic, but also a thinking, reasoning physician. His operations are not of the fireworks variety, which win the plaudits of the admiring onlookers, but they consist of steadily progressing movements, well calculated and purposeful. He is sure of his anatomy, knows his physiology, is well versed in surgical pathology, is an excellent teacher and so obtains ideal therapeutic results.

Bier is a veritable dynamo of surgical originality. His mind is fertile with problems, thus forming a source of inspiration to his coworkers. He is a forceful and impressive teacher, and a highly gifted surgeon. Among his pupils, Schmieden is the most noted. He occupies at present the chair of surgery in the University of Frankfurt. I have visited Schmieden and saw him work. His clinic is a marvel of thoroughness and his technic admirable.

My impressions of German general surgery lead me to say that the training and preparation which the surgical aspirant has to undergo before he is entrusted with surgical responsibilities is far more sound and thorough than it is in our own country. In the consideration of appointments for surgical positions, technic alone is not the chief desideratum. The candidate's preliminary education in pathology, bacteriology, anatomy and experimental physiology count as much, if not more. The administration of general anesthesia in Germany is very poor and it would be to the credit of German surgeons if they would send a few of their younger men to learn the art of anesthesia in America.

GYNECOLOGY AND OBSTETRICS.

These two specialties are inseparably linked together in all the teaching centres. In the Berlin University there are two clinics represented by Bumm and by Franz.

Bumm, in the opinion of the author at least, has no equal as a teacher in these specialties. His lucidity of speech, thorough mastery of the subjects, wide experience, general information and scholastic attainments, in addition to his artistic endowments, which he brings into play in the process of teaching, contribute to make his lectures impressive, and fascinating. The surgical work in this clinic is fair, and neither Bumm nor any of his associates display surgical ingeniousness. The department of Röntgen therapy is under the direction of Warnekross who, in collaboration with Dessauer, has contributed much that is of lasting value.

The description of this famous clinic would be incomplete if I were to omit the mention of its pathological department which reflects upon it just as much glory and renown as do the other departments. Robert Meyer directs this department. His fame is international and it would be futile for me to attempt a description of what this master in morphology and embryology has contributed to the science of gynecological pathology for the past twenty-eight years. My close association with him for six months leads me to say that, to know Robert Meyer is a great privilege, to work with him a rare opportunity.

The Franz Clinic is preeminent for the surgical genius of its guiding chief. There is no gynecologist in Berlin and, as far as I have seen, anywhere else, who can equal Franz in surgical dexterity. With the precision of a mathematician he calculates every step with lightninglike rapidity, wielding his instruments with the grace, poise and alacrity of an accomplished artist, and all this is done under the control of sight, in which he is greatly helped by the excellent illuminating system in his operating rooms. His method of teaching varies from that of Bumm in being much simpler, more practical and not as all embracing. Franz wants his students to learn what is really essential to know in the usual pursuit of obstetrics and gynecology, to recognize complications in time and to obtain or render competent assistance before it is too late. The pathological department of this clinic is ably conducted by Dr. S. Aschheim, who is an excellent teacher, a fine clinician, and a most amiable personality. Of his younger assistants B. Zondek is the most promising. His preliminary training in physiological research and biological chemistry enables him to grapple with the problems dealing with pathological pregnancy, endocrine dysfunctions and organotherapy. Gynecology and obstetrics will undoubtedly be enriched by his scientific labors.

The Franz Clinic also deserves mention for the democratic spirit which it radiates, in contrast to the austere and repelling atmosphere of obsolete militarism which still lingers in that of Bumm.

The Wertheim Clinic in Vienna is another great centre of gynecological and obstetrical learning. It was not my good fortune to find the master alive. His place was temporarily filled by his ablest and most distinguished pupil, Weibel, who through some reasons unknown to me was not called upon to fill the chair as was expected by so many. Professor Kermauner is now the head of this great clinic, and what I have seen of his work behooves me to say that next to Franz, Weibel is the most skillful gynecologist I have thus far known. Weibel has also done an extensive amount of work in the field of röntgen and radium therapy. The attitude of this clinic towards the problem of irradiation or operation in uterine cancer and myoma, is the same as that of the Berlin clinics, namely to operate in all operable cases.

RÖNTGEN AND RADIUM THERAPY IN GYNECOLOGY.

The exclusive use of röntgen and radium therapy in uterine cancer and myomas is carried out with scientific exactness and clinical thoroughness in the clinics of Freiburg, Erlangen, and Frankfurt. In these clinics röntgen rays are chiefly used at times also radium either alone or in combination with x rays. The representatives of these schools are Kronig, Seitz, Wintz, and Opitz. The majority of Germany's leading gynecologists still follow the dictum of operating upon all operable cases. The question may therefore be raised as to which of these schools is in the right. From a perusal of the statistics furnished by the contending clinics it becomes evident that the curative results are equally good yet we see the pendulum swinging from time to time in favor of one group to the other. What gives rise to these clinical oscillations and vagaries? It is the variation in the sources of information from which the statistics emanate. "Statistics," Sir Berkeley Moynihan once said, "can be made to tell anything, even the truth," and indeed they do tell the truth of the observer as seen from his own angle or as the result of his personal experience; and here lies the great clinical difficulty. Into the compilation of surgical statistics the personal attributes of the given surgeon enter to a great extent and, what a skillful surgeon may consider operable, a less skillful one may consider inoperable. Besides these apparent and unavoidable clinical inconsistencies, we also encounter biological difficulties which still await a solution. We often see that pathologically similar cancers are influenced differently by the same quantity and quality of rays, or that patients suffering from identical cancers are differently affected by them or respond differently to the same kind of treatment.

In view of all these still unsurmounted difficulties, the only course left for us to pursue in deciding upon a plan of treatment for uterine cancer or myoma, is to individualize our patients and adopt such a therapeutic procedure which under the given circumstances will render the highest percentage of cures and the minimum of mortality. Only self-criticism, and an honest comparison, from time to time, of the operative with the nonoperative methods will lead to the highest efficiency.

WHO SHALL ADMINISTER RÖNTGEN AND RADIUM THERAPY?

In Germany the specialty of röntgen and radium therapy as such, is fast losing ground. The clinicians contend that since röntgen and radium rays are therapeutic agents, those who have the patients directly under their control and understand the disease as well as the diseased, are the ones best suited to administer the treatment and judge its effects. As a result of this sound and rational attitude, we find now that in each medical centre the various departments have each its own röntgen and radium outfit. There is also a central röntgenological laboratory, but this serves as a scientific clearing station where the clinicians report their results as obtained in the course of treatment, and where the biologists and the physicists analyze these observations and are thus guided to further biological research and to improvements of the apparatus.

To view the problem of irradiation therapy in a scientific and impersonal light we must admit that the highest degree of perfection in this field of therapy will be reached where the biologist, the physicist, and the clinician will act cooperatively and reciprocally.

POSTGRADUATE STUDY.

The character of the work done in the German undergraduate clinics is of such a high scientific standard that graduates may for the rest of their lives return periodically to these mainsprings and always find an abundant supply for replenishment, rejuvenation, and invigoration.

But the function of Germany to foster and promote postgraduate study does not halt here. Every university clinic is ready to extend privileges to graduates to pursue original research or to further develop their clinical usefulness. In the Kaiserin Friedrich house, lectures on all medical subjects and allied sciences are delivered three times daily. The profession at large is welcome. The lecturers are recruited from the large staffs of ordinary and extraordinary professors. Those who cannot attend may obtain copies of the procedures for the asking and in this way the members of the profession are kept in constant touch with the most recent advances in theoretical and practical medicine.

Another striking fact which, in my opinion, accounts for Germany's supremacy as a teaching centre, is the willingness of their leaders to teach. No man considers himself too important to spend some of his time in directing or guiding those who seek information.

Besides the university clinics and laboratories there are a number of similar private institutions. The leaders of these excathedral schools are men who, having worked under and with masters for many years, finally branch out for themselves establishing their own platforms and preaching their own medical gospels. The architectural appearance of many of these clinics makes a very unfavorable impression upon Americans in particular for they are far from being models of sanitation and comfort. But what monumental work has emanated from many of these places! I saw the place where Pappenheim did his work on the blood; where Oppenheim taught the world neurology; and where Michaelis is still engaged in enriching the science of physiological chemistry. All these structures are old, dilapidated, and unhygienic. Evidently knowledge does not always seek gilded halls for its abode, and the humblest dwellings may become its hallowed shrines.

RÉSUMÉ.

1. Germany's adoption of a standard system of medical education permits its students to pursue their training in more than one school, thus lending breadth and color to their professional development.

2. The fundamentals in medicine are taught with a thoroughness that beggars comparison. The major subjects are imparted to the student, not as something separate from the whole of medicine, but as parts of it through the clinical method of teaching or, as Osler called it, "The natural method, which begins with the patient, continues with the patient, and ends with the patient."

3. Group medicine, which greatly agitates and perturbs the minds of the modern American clinicians will never take root on German soil. Germany's leading clinicians have trained themselves, and continue to train their successors, to be clinicians in the full sense which this term implies. A very apt definition of a clinician, or of how a real clinician should practice, was recently described by H. A. Royster; it reads as follows: "Let us first take a look at the patient; use our minds in obtaining a history; perform a laying on of hands; after which we will ask for the aid of scientific apparatus which may either confirm or reject our observations. And if the laboratory findings do not agree with the clinical signs, then so much the worse for the laboratory." This is the conception of clinical medicine which our older clinicians have had, and to this dictum the German clinicians are still adhering closely. Group medicine in Germany is considered as a confession of clinical inferiority for it tends to hinder the development of the clinical art. Neither Germany, nor

any other European medical centre, will lend its support to a form of practice which is subject to the schematic plans drawn in the laboratory. Clinical medicine demands individualization, and now more than ever before should this truth find expression. The patient as such must always remain the focus and centre of our biological thinking, and this is not possible with methods which call less and less upon the exercise of our clinical intuition and sagacity.

4. Each school in Germany has as one of its greatest and prime functions the training of future teachers and in this sublime duty to future generations each medical leader takes his part with pride.

5. The effect which the late war has had upon Germany is chiefly economic. Its scientific life it seems has not only regained its prewar calm, but has gained in renewed vigor. There is much that German medicine can offer us. Are we not going to accept it? Political boundaries should not stand in the way for science does not recognize them and the most eminent thinkers of the world have clasped hands across them. Let us extend our friendly arms to these earnest workers; let us encourage them and be stimulated by their example of devotion to science for science's sake.

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1125 Madison Avenue.

William Edward McGuire, M.D.*

By BEVERLEY R. TUCKER, M.D.,
Richmond, Va.

The medical profession of Virginia feels, as the American Therapeutic Society undoubtedly does, a sense of personal loss in the death of Dr. William Edward McGuire, which occurred in Richmond, Va., on October 6, 1921.

Dr. McGuire came from a long line of distinguished American ancestors who in turn were descended from a prominent and virile clan, the McGuires of central Ireland. Dr. McGuire was born in Berryville, Clarke County, Va., in 1860 and was a cousin and brother-in-law of our fellow member, Dr. Stuart McGuire. He attended school in Berryville and in 1886 graduated in medicine at the University of Virginia. After his graduation and the completion of some postgraduate work he began the practice of medicine in Richmond and remained there until his death. He occupied the chair of gynecology, then that of clinical medicine at the University College of Medicine, and later the chair of clinical medicine at the Medical College of Virginia. He held various positions of trust and was at one time president of the Richmond Academy of Medicine. He was also a member of the State Board of Health of Vriginia, a volunteer in the medical service of the U. S. A., a Fellow in the American College of Physicians, a member of the International Gastroenterological Association, the American Therapeutic Society, and of many smaller societies.

Early in his professional career Dr. McGuire practised both surgery and general medicine, and it was said of him that he was "an old fashioned family doctor with the methods of a modern physician." In the later years of his life, though he never entirely gave up his family practice, he became noted as an internist and diagnostician.

It was said of him at the time of his death, by the editor of one of the Richmond newspapers, that "no man in his generation had been more loved in Richmond than Dr. Edward McGuire. Endowed with the gift of medical perception which often amounted to pure intuition, Dr. McGuire never trusted to mere natural ability. The easy course was never the course that appealed to him and in the midst of an enormous and exacting practice he took time to keep abreast of the modern developments in the field of medicine. All the amazing growth of technic Dr. McGuire made tributary to his practice, and to science he added experience, so that, with his medical gifts and his wide opportunity he made of the new knowledge a hand maiden and not a tyrant. It was his loyalty to his patients that gave him among physicians a distinctive title—he was not Dr. McGuire to Richmond; he was Dr. Ned."

It is to his personality and character that I especially desire to pay tribute. I only wish that mine was the power to pay it adequately. Many men have been successful practitioners and scientific physicians but he had added to these qualities a character which was a tower of strength and a personality which made him genuinely and generally beloved. Dr. McGuire lived through a period when professional antagonism and animosities were the order of the day, but through it all he maintained the admiration and respect of all factions. In all things he was a man of sound judgment, deliberate action, clear conception, conscientiousness and moral courage. He was broadminded and benevolent and his criticisms were without malice. His service to his profession and his patients was untiring and his knowledge was wide but at the same time accurate.

At the age of sixty-one he came to the end of his life, a life full of rich experience but cut short by his unsparing sacrifice to work. For years he had a kidney condition which was at times very painful and which he knew was incurable, but he never complained and he never gave up. I am glad that I had the privilege of knowing "Dr. Ned" and that the members of this society had the privilege of knowing him. He was a gentleman of the old school who greeted us with kindness and a courtesy, whose words could be depended upon, whose opinion, though valuable and modern, and backed by experience, was never egotistical or obtrusive, and we think of him as a man whose example we should like to emulate.

212 West Franklin Street.

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Editorial Articles

THE QUEST OF THE UNKNOWN

"In the teeth of the outrageous, the absurd disabilities imposed on him, Man, the imperfectly denatured animal, who cannot trust the evidence of his own senses in the simplest matter of fact; whose evidence on the simplest matter is colored by his own iniquities; Man, always the hunter, went up against the darkness that cloaked him and every act of his being, to find out what order of created being he might be. He called it scientific research. It was the old quest under a new name. But this time the seekers who headed it, unlike the priest and the lawyer, admitted that they knew very little. Experience had taught them to be humble. For that reason their knowledge was increased. They moved forward into areas of the body, which, till then, had denied themselves to Man's hand. They were turned back, without explanation, from other areas which, as yet, would tolerate no spying. They were bewildered by mysteries which, under some new mirage of observation upon accident or some predestined slip of the knife, resolved into—mysteries profounder still! Is it any wonder that all the old dreams came back? The dream of the essential unity of all created things—the dream that some day that which men called life might be led into matter which men called dead—the boldest dream of all, that eventually Man might surprise the ultimate secret of his being where Brahm had hidden it, in the body of Man. And, meanwhile, their days were filled with the piteous procession of men and women begging them for leave to be allowed to live a little longer, upon whatever terms."

The address of Mr. Rudyard Kipling at the dinner given by the Royal College of Surgeons after the Hunterian Festival on February 14th last adds to the understanding tributes which have been paid to that body of seekers whose quest is the relief of suffering and the prolongation of life. It is more than praise, it is a psychoanalysis of the very spirit of medicine and the urge which energizes its patient, selfless search for truth. Man, according to Mr. Kipling, is "an imperfectly denatured animal intermittently subject to unpredictable reactions of an unlocated spiritual area. And it is just this search for this unlocated spiritual area, whether it be a growth or a survival, which has preoccupied Man. The priest and the lawgiver have probed and fished for it all through the ages; but, more than any other, through all the ages, the leech, the medicine man, the healer, has been hottest on its track."

Ever the elusive search moves onward. Just as we seem to be about to touch upon its mystery, new horizons unfold before us. Undismayed we hopefully push ahead, always reaching out for the infinite, jealously guarding our little store of half understood, half mistrusted facts, firmly believing that the unattainable will be soon achieved.

A GREAT BRITISH SURGEON

The really great surgeons of the world may be counted on the fingers of two hands; perhaps, on the fingers of one hand. As Sir Frederick Treves says in a book published recently, the great surgeon is born, not made. A great surgeon died on March 15th last. Sir William Thorburn is referred to. At the time of his death he was emeritus professor of clinical surgery at the University of Manchester.

The son of Dr. John Thorburn, professor of obstetrical medicine at Owens' College, Manchester, William Thorburn was born in that city in 1861, received his medical education at the Manchester Royal Infirmary, afterwards attending various hospitals of London. He had a distinguished career as a medical student and took the degrees of B. Sc. and M. D. at the University of London, obtaining the gold medals and winning a scholarship. He was elected to a fellowship of the Royal College of Surgeons in 1886, and was appointed assistant surgeon to the Royal Infirmary, Manchester. He quickly made a reputation for the treatment of injuries of the spine, injuries which occur frequently in a manufacturing area like Manchester and neighborhood, where machinery is used largely. Up to the time that Thorburn devoted his attention to this subject, little notice had been paid to it. However, he made use of the numerous opportunities which came his way to such purpose that in 1890 he was awarded the Jacksonian Prize for an essay on The Nature and Treatment of Injuries to the Spinal Column and the consequences arising therefrom. He also made these injuries the subject of a course of lectures he delivered as Hunterian professor of pathology and surgery at the Royal College of Surgeons of England. Indeed, he so made the question his own that he came to be regarded as the leading exponent of and authority on this branch of surgery, not only in Great Britain but throughout the world. In December, 1922, he chose it as the subject of his Bradshaw Lecture and summed up his experience of fifty years or thereabouts in a somewhat despondent fashion. But at that time he was a thoroughly depressed man and this fact must be taken into consideration.

His outlook on life was gloomy. At the outbreak of the war he was already holding the rank of lieutenant colonel in the R. A. M. C. Territorial Force, and was at once placed in command of the Second Western General Hospital. His three sons were killed in the war. He was appointed consulting surgeon at Malta, Gallipoli and Salonika, and in 1917 he filled a similar position in France. For his services during the war he was given a C. B. in 1916, and a C. M. G. and military K. B. C. in 1919, while during his stay in Malta he was given the honorary degree of M. D. by the University of Malta.

From 1913 to 1923 he was a member of the Court of Examiners at the Royal College of Surgeons, and he also served as an examiner in surgery at the University of London. In 1914 he was elected a member of the Council of the College of Surgeons. Lady Thorburn died in the autumn of 1922, a blow from which he never recovered. Thorburn was, as are so many great men, of modest, gentle and unassuming nature. However, he was of a strictly scientific mind, of strongly formed opinions and withal a persuasive speaker, and he exercised a good deal of quiet influence. He retired from active work a short time ago, but he was so broken in spirit and health by the events of the war and the death of his wife that he felt he had nothing left to live for, and although he struggled bravely the zest for living had gone, and the effort was too much for him. He was a man who deserved well of his country and science and was an honor to his calling.

CURES FOR PNEUMONIA

Much has been published recently in the lay press concerning the beneficial effects in pneumonia of external applications of heat, by means of lamps or electric currents. Unfortunately there is no statistical evidence that the assertions made for results obtained are based upon more than the usual optimism accompanying the use of a novel therapeutic agent, and, possibly, some fortunate results not connected with the treatment. In at least one series of cases, in which it was stated that excellent results had been obtained, the patients were of the type in which the best progress would be expected.

But is there anything new in such treatment? The application of external heat, in the form of poultices of various kinds, has long been practised, but with doubtful success. These measures, at any rate, have had no effect in proportion to the amount of heat afforded and a pneumonia jacket or plain shirt seems to have answered the purpose as well. The heat from a lamp is of precisely the same kind as that from an electric pad, or, for that matter, from a wet poultice. As for penetrating heat, the temperature of the body is already raised to 104° or so, which is certainly hot enough for any good results. Why attempt to add to it?

To expose the affected side of the chest to radiant heat, the patient must lie upon the unaffected side, which is surely not a good mechanical procedure. Any claims made for effects produced by electric currents or by certain rays of light are problematical indeed.

We are reminded that a few years back claims were made for great results from the open air or cold air treatment of pneumonia, but actual figures showed that the results were the same, whether the patient was treated out of doors or in. An effective treatment of pneumonia, or better still, a means of preventing pneumonia, will be of the utmost importance, and we trust that these much heralded physical means will be given a thorough trial. We feel, however, that there is nothing to justify any very optimistic hope of their effects, and it is a pity that the reports of highly successful accomplishments should be broadcasted through the lay press before there is any certain ground for such statements.

THE EDUCATION OF BOYS AND GIRLS

The proper education of the rising generation is a most important matter, for upon it depends, to a large extent, the future of a country. The definition of a proper education is perhaps impossible to give as ideas of what constitutes this vary considerably in different countries and among different classes of society in the same country. The American ideal of education is perhaps of a practical nature, one which will fit its possessor to hold his own in the battle of life.

In Great Britain, although views are changing, the ideal of education has been to form character rather than to inculcate knowledge, and a great deal of the knowledge imparted, that is, in the higher class schools, is of a character that Americans would regard as of the most useful kind. But classics are not the bugbear of the big British schools they used to be and as a matter of fact education therein partakes more now of the American flavor than was the case some few years ago. Coeducation is not so common in Great Britain as in America. The true ideal of education of both sexes is to develop both mental and physical powers and not one at the expense of the other. And this statement applies to girls as well as boys and, perhaps, more especially to girls.

In Great Britain there was published recently the report of the consultative committee on differentiation of the curriculum for boys and girls, respectively, in secondary schools. It will be futile within the scope of an editorial article to attempt to more than touch upon some of the most salient features of the report and these features will be those that concern medical evidence taken before the committee with regard to the education of girls. The committee, in view of the medical and other evidence, urges with considerable force that the pace of education in girls' schools should be carefully adjusted to the strength and opportunities for study which may be presumed of the average pupil. Not that they plead for any special consideration or lower standard of achievement for a socalled weaker sex; as they are convinced that given the same conditions girls can match the achievements of boys. But the conditions of health are not the same, and the freedom from other demands is much less for girls than it is for boys. Warning is given against overorganization. The increased *esprit de corps* in school life and the growing tendency to organize and emphasize all school activities are modern developments which stand in need of criticism and control, more particularly in girls' schools. The special danger of girls' schools is that they may become excellently organized and conscientiously loyal groups composed of mediocre and uniform units. Which means that plenty of play and scope for individual effort should be allowed.

However, so far as the health of girls at school is concerned, it is the question of games and physical exercise which is of the greatest import. It is supremely essential for the future of the race, that girls should be in such condition that they can bear and rear healthy offspring. Whatever the modern woman may say to the contrary, it is this function of woman that distinguishes her and it is of greater importance by far than anything else she may or can do. Because a woman is well educated and good at games is no reason why she should not be a mother. But if overeducation or overexercising at games is likely to injure her in this respect, then education and games should be modified.

With regard to games for girls the committee says: "Most witnesses, including several parents, thought that the general conscientiousness of girls extended also to their sports and that there was danger that some pupils, who were overconscientious and docile, might exhaust themselves physically and mentally for the supposed good of the school. There was general agreement that special care was required in organizing games for girls in day schools, and more especially in coeducational day schools." The committee suggests in the light of the evidence given before them that the whole question of games in day schools for girls and in coeducational day schools requires further investigation. While they think that suitable games should form a part of the ordinary curriculum for girls, they are not convinced that they should be made compulsory for all pupils, particularly in day schools. Hockey, lacrosse, tennis and cricket for girls were favored by most witnesses, but not football.

Commenting on the susceptibility of girls to fatigue, the committee says that their physiological evidence and a large part of the evidence from teachers, indicate that girls are, on the whole, more liable to physical and mental fatigue than boys. This may be due, not only to the larger reserve of strength possessed by boys, but also to the greater power of resisting pressure. It is well known that most boys, especially at the period of adolescence, have a habit of "healthy idleness," and are thus able to protect themselves from overpressure, whereas girls are more amenable to authority and more industrious. This is an inherited trait, probably due to generations of subjection more or less, although the committee does not say so. However this may be, the girl's greater docility and industry deprive her of some of the protections which the boy enjoys. The committee, therefore, thinks that, on the whole, the traditional arrangement by which the number of hours spent in school and the amount of time actually devoted to many subjects is shorter in girls' schools than in schools for boys is probably based on sound reasons, and that it is inadvisable to have the girls' time table too much like that of the boys. Among the recommendations offered by the committee is one for greater freedom in the curriculum in boys' and girls' schools; that time tables should be modified to allow boys and girls more free time in which to develop their own individual interests. Another recommendation is that more attention should be paid by parents, headmistresses, and school doctors to the possibility of taking suitable precautions for the protection of girls against physical fatigue and overstrain.

The report is instructive and interesting and only goes to show that the saying of Sir Almroth Wright is true, that woman is hampered by her physiological disabilities, that is, if she desires to compete with man, with the reservation that civilized woman is meant. Rough games are bad for girls, in that they may prejudice the chances of motherhood in some and thus be harmful to the race. Also such games tend to coarsen them and to impair their special feminine qualities. The modern woman will characterize the last sentence as old fashioned nonsense, but it is a point of view to which, perhaps, the majority of men incline. There is one point in the education of boys and girls to which sufficient heed has not been given, namely, that in the education of both sexes either in school work or in games, the personal equation is not considered as it should be. "What is one man's meat is another man's poison" is true in this particular. Neither boys nor girls should be made to play games unless a doctor thinks the game suitable for them and, of course, this remark may be emphasized as regards girls. Moderation in all things is an excellent maxim and quite applicable to the education of boys and girls, in school work and games alike.

SUGAR AND ALCOHOL

It was said by more than one writer in American medical journals, and the subject was especially emphasized in the editorial pages of the *Medical Record*, that when prohibition came into force the consumption of candy and sugar, in general, would be increased. This has been the case, and the question arises as to whether it is altogether so great an advantage as most people think. Given the choice between sugar and alcohol, there is no doubt which does the greater harm, but sugar, unless used discreetly, is by no means the beneficial food which some of its ardent advocates have declared. Indeed too much sugar is largely responsible for the early decay of teeth and disorders of the gastrointestinal tract.

A peculiarly appropriate editorial on the question appeared in the *British Medical Journal*, March 24th last. It appears that the British Chancellor of the Exchequer may have to make a choice between a reduction of the tax on sugar and a remission of the duty on beer, or this was so at the time the editorial was written. The writer of the editorial, therefore, discussed the matter from the physiological viewpoint. As a matter of fact, from the purely physiological point of view, neither alcohol nor sugar can be esteemed essential to the human dietary, and, of course, from the economic aspect they are luxuries. From the dietetic and caloric viewpoints the value of alcohol is considered now to be almost negligible, and the esthetic and anesthetic properties of alcohol cannot be expressed in terms of food value.

But, as was pointed out, if it is difficult to defend the virtues of beer and other forms of alcohol physiologically, it is equally difficult to defend sugar on the plea that it is a food of high value for children. It is only infants in arms who depend on sugar as the source of their carbohydrate supply, and this is merely because their capacity for converting starch has not yet been properly developed. As all starches are ultimately converted into sugar by the efficiently working human machine, and as starch is infinitely cheaper than sugar, it is more economical by far to consume starch than sugar. Moreover, sugar suffers from a disadvantage not possessed by starch. It is readily digested and absorbed so that when ingested in undue quantities it may pass into the blood more quickly than physiological conditions require and thus do more harm than good. Insoluble carbohydrates have not these drawbacks and, as said before, are a great deal cheaper. The agreeable taste of sugar may in itself prove a pitfall to the young, inducing children to eat of it to excess with serious pathological results.

Another British writer, Dr. Harvey Campbell, has no hesitation whatever in asserting that sugar eaten in large quantities by children has an extremely pernicious effect, and many well known dentists assert that eating saccharine substances to excess has ruined many teeth and digestions. Our ancestors were healthy without sugar and it has been in prevalent use in temperate climates only for a comparatively short time. Its value in the form of candy from the physiological and dietetic aspects has been grossly exaggerated and there is no doubt that taken in excess it is harmful to health.

There is no doubt that American children and even a large number of adults eat much more sugar than is good for them. This is not to say that candy should not be eaten by children or adults, but discretion should be observed and children should not be allowed to gorge themselves with sweetstuffs. At any rate, we have done our duty editorially in demonstrating that from the strictly physiological and dietetic points of view sugar is not a necessity.

COFFEE

When medical men think of coffee they involuntarily divide it into two divisions: one, the active principle, caffeine, which is a valuable therapeutic agent, and the other, to which they give little thought, ordinary coffee, cups of coffee. Throughout the world we find coffee drinkers and tea drinkers fairly evenly distributed. Here in cosmopolitan America, where old world influences have formed customs, coffee drinking predominates. In certain sections of the Orient and in the Balkans, the coffee is prepared Turkish style, finely ground with the grounds left in the bottom of the cup. Small cups of this sweetened beverage are consumed at different times of the day. The more common preparation of coffee here calls for a generous sized cup which may be prepared in many different ways. Percolation is a method which is fast gaining in favor.

Many neurotics receive with gladness the tale of the harmfulness of coffee. They eagerly welcome innocuous substitutes, coffee minus the caffeine, or some nauseating cereal preparation. They think by avoiding coffee they cure their nervous condition. This whole question has been exaggerated. Coffee in moderation does not produce nervous ailments. Removal of coffee from the diet does not cure them. Coffee with cream and sugar is a source of food and energy. In many cardiac and nephritic conditions there is no better or simpler preparation than well prepared coffee. It is amusing to see chocolate, cocoa and even tea substituted for coffee in various nervous or other conditions, when as a matter of fact the amount of stimulus cup for cup is the same or even greater. What foundation there is for giving children and old persons various chocolate preparations in place of coffee is difficult to determine.

It would be well to look at the coffee question squarely and not cover the situation by inane avoidances. Coffee is one of the mainstays of our rapid civilization. Those adults who wish to live and enjoy life, let them drink their coffee in peace. Those who wish to ascribe illness or nervousness to magical causes, let them abandon it.

PUBLIC HEALTH LECTURERS

Dr. S. Dana Hubbard, director of the New York City Bureau of Public Health Education, writes in the *Monthly Bulletin* of the Health Department an article giving some valuable directions and suggestions to lecturers on public health. If the advice given by Dr. Hubbard were followed, in part even, audiences at lectures of this kind could probably be doubled, to say nothing of increasing the amount of information and benefit received by those attending them. "The health talker is permitted to use every resource," says Dr. Hubbard, "poetical license not excepted, to insure that every hearer will become possessed of at least one clear fact of hygiene. Misinformation, exaggeration or deception are never permissible. There is no speaking platform more punctiliously accurate, and where the speaker must 'watch his step' more carefully than that of the public health forum. The truth is always demanded. The truth only should be given. . . ."

The following simple rules for giving health talks are among the suggestions made by Dr. Hubbard: 1. Be punctual at your appointments and keep to schedule. 2. Always be announced; let the introducer state your subject and inform the audience who you are and what has been your experience. 3. Adapt yourself to your audience; show that you understand their everyday problems and trials; be sympathetic; in your remarks, encourage all to aim high and help, in so far as is possible under the circumstances; with the uneducated or uninformed be definite and decided; uneducated persons are not intellectually able, as a rule, to appreciate nice scientific balancing of facts and theories. 4. Show that you practise what you preach. 5. Never read your speech; never speak from full notes; have, if you must, a rough outline of headings of your topic, but trust mostly to the inspiration of the moment and the sudden opportunity. 6. Never talk too long; a prominent pastor was advised by an eminent statesman that "few souls are saved after twenty minutes." Nothing is more tedious, especially to manual workers, than a lengthy, long drawn out speech; a short, snappy talk of ten minutes often gets over where a half hour harangue gets blocked. 7. Encourage questions; interruptions, even, are very helpful, oftentimes, in health work; if the audience appears bashful or diffident, stir up one or two individuals in the group by talking directly to them, or through them to the group; it might be well to prearrange to have some prominent person start the questioning when you are ready; a few minutes devoted to general discussion oftentimes brings out a splendid reaction. 8. Repeat and reiterate again and again; do not be afraid of repeating your statements; to test this, read some well written propaganda; you will find the subject repeated, time and again, but always in different phraseology.

CHILD SUICIDE SINCE 1918

In the recently published annual report of the Save a Life League, an organization, with headquarters in this city, which works toward prevention of suicide, some rather appalling figures are given, showing that, since the war, suicides in this country among children have nearly doubled in number. The figures quoted are based upon official reports, which means that the actual number of such suicides, if known, would make the quota much higher.

The report states that since 1918 the number of suicides in the United States among children is 3,000. In 1918 the figure was 477; in 1922 it was 900. The youngest suicide was five years old; the oldest, a great great grandmother, more than a hundred years old. In some parts of the country the figures seemed to indicate a sort of suicide wave or epidemic. A girls' suicide club was discovered. The average age of boy suicides was sixteen years; that of girls, fifteen. The boys' most prevalent method was the revolver; that of the girls, poison. A large proportion of the alleged reasons for the act were unbelievably trivial and foolish. One girl left a note saying that she was going to kill herself "to get a new thrill." A boy shot himself "for the fun of it." Another girl committed suicide because she did not find her newly bobbed hair as becoming as she had expected.

The report lists among chief causes for this state of affairs, intolerable home conditions, temperamental disorders, faulty school systems, and, most important, the large and increasing number of child marriages. In 1920 the number of boys married at fifteen was sixteen hundred; of girls, twelve thousand. Of these, records show that five hundred were divorced or widowed.

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News Items.

Dr. George B. Shattuck Dead.—On March 13, at his home in Boston, Dr. George B. Shattuck, for many years editor of *The Boston Medical and Surgical Journal*. Dr. Shattuck was born in Boston in 1844. Some years ago he made a trip to Central Africa for a scientific study of the health and mode of living of primitive peoples.

Dr. Lorenz Opens Free Clinic.—Dr. Adolph Lorenz, the Austrian surgeon who operates without the use of a knife, opened a free clinic at the Health Department, 505 Pearl Street. He treated many persons with physical bone defects and also a few cases of infantile paralysis. The clinic will continue every Monday until Dr. Lorenz sails for his home.

Medical Care of New York School Children.—A bill which will provide medical and dental service for all public school children of New York is at present before the legislature. This bill has a clause appended, however, that such medical and dental care afforded by the schools does not limit the power of parent or guardian to determine what treatment or correction should be provided for their children.

American Doctor Appeals for Aid for Russia.—At the annual meeting of the American College of Physicians which was held in Philadelphia last week, a letter was made public from Dr. H. O. Eversole, member of the Commission on Russian Relief, in which he made an appeal for funds, medicines, medical literature, etc., for use for medical aid in Russia. After hearing the letter the American College of Physicians endorsed the appeal.

New Jersey Academy of Medicine Auditorium.—On the twelfth anniversary of its organization, the Northern New Jersey Academy of Medicine celebrated the dedication of a new auditorium having a seating capacity of four hundred at Newark. Dr. George E. deSchweinitz, president of the American Medical Association; Dr. John M. T. Finney, of Johns Hopkins University; Dr. James Hunter, president of the Medical Society of New Jersey, and others attended the formal dedication.

Physiotherapy.—The next course of instruction in physiotherapy will be given at Walter Reed General Hospital, Washington, D. C., beginning October 5, 1923, and continuing for a period of four months. It is open to women who have had at least two years of training in an approved school of physical education. For further information apply to the Commanding Officer, Walter Reed General Hospital, Washington, D. C., attention Department of Physiotherapy.

Suicides in 1922.—Seventy-nine millionaries were among the 12,000 persons who committed suicide in 1922, it was reported by Dr. Harry M. Warren, president of the Save-a-Life League. One third of those who killed themselves were women, the oldest a great great grandmother, one hundred years old, and the youngest a child of five. Among others in New York there were thirty-eight college students, fifty college professors and school teachers, nineteen preachers and leaders of religious work, fifty-two judges and lawyers, eighty-four physicians, one hundred presidents and heads of large business concerns, and a number of bank presidents, one of whom tried ten times to die before succeeding.

Sleeping Sickness Again Reported.—The Public Health Service at Washington announces a total of 575 cases of encephalitis lethargica for the first three months of 1923. The disease was most prevalent in the week ending March 3rd, sixty-nine cases being reported. The total for the week of March 31st was thirty-seven. Public health officials pointed out that the figures were not exact. Since the germ of the disease has not been definitely isolated, physicians in a number of cases have confused the affliction with meningitis and other diseases. One case recently reported as "sleeping sickness" turned out to be coma resulting from a mastoid infection. Dr. Burton Harris, a Brooklyn surgeon and for four years secretary of the Medical Society of Kings County, recently succumbed to the disease.

Epidemics Spread Among Refugees.—Typhus and smallpox epidemics in the refugee camps of Constantinople are spreading. Pauline Allen, of Boston, American Near East Relief worker, was stricken with typhus and is in the American Hospital. Douglas Quirk, editor of the only English daily newspaper published in the Near East, contracted smallpox. Mme. Ali Bey, wife of a prominent Turk, died from typhus. Six physicians have succumbed to typhus while attending refugees.

Personal.—Dr. Charles Gottlieb, of 210 West Seventy-ninth Street, sailed for Europe on March 31st. A farewell dinner was given in his honor by his students at the Hotel Astor on March 28th. At this time there was organized the Manhattan Röntgen Ray Society. The following officers were elected: President, Dr. Charles Gottlieb; vice-presidents, Dr. J. S. Smul and Dr. H. Reinstein; secretary, Dr. L. Neuwelt; treasurer, Dr. Lesoff; historian, Dr. M. Spinrad; members of the executive committee, Dr. M. Beegel, Dr. B. Goldstein, Dr. T. B. Weinberg, Dr. S. Gellert, and Dr. J. Abowitz.

Hospital Hotels for New York City.—Plans have been filed with the Bureau of Buildings for the construction of a twenty-two story fireproof hospital hotel that is to be erected on the northwest corner of West End Avenue and Seventy-second Street by a syndicate of New York surgeons and physicians headed by George R. Hall. The building is estimated to cost $1,000,000. The hospital hotel will have four hundred rooms exclusive of four large operating rooms. The ground floor will have a two story lobby and a public dining room. There will also be extra dining rooms, and each floor will be equipped with serving rooms. The vacant property at the south corner of Fifth Avenue and 103rd Street has also been taken as a site for a tall hospital hotel which will provide all the comforts of the finest hostelry in the city. A group of physicians have purchased the property in the name of the Physicians' Medical Hotel Corporation. There will be twelve stories in this hospital hotel and will cost close to $2,000,000.

Courses of Instruction in Pulmonary Tuberculosis Under the Auspices of the U. S. Veterans' Bureau.—By authority of the Director of the U. S. Veterans' Bureau a preliminary course in pulmonary tuberculosis has been given in twenty Veterans' Bureau Hospitals. The course is for the instruction of physicians in the Bureau service. Those who have completed the course are eligible to attend the postgraduate course now being given, and to be repeated at intervals, at Veterans' Hospital No. 41, New Haven, Conn., and at Fitzsimons General Hospital, Denver, Colo. These latter schools began March 1st and 5th respectively. The chief instructor of the New Haven School is Dr. Nathan Barlow, of the Public Health Service. The Denver School is in charge of Major E. H. Bruns, M. C., U. S. A., Chief of the Medical Service. The instructors in the New Haven course are not only tuberculosis specialists connected with the Public Health Service and the U. S. Veterans' Bureau, but well known specialists not in the Bureau service.

The general supervision of both the preliminary and the postgraduate courses is in charge of the Clinical Director of Tuberculosis in the Central Office of the Bureau, Washington, D. C.

VIENNA LETTER

(*From our own correspondent.*)

VIENNA, *March* 30, 1923.

FIRST IMPRESSIONS.

The first thing which struck me in Vienna as quite extraordinary—compared to what I was used to see on my numerous prewar visits to Vienna—was the great number of really welldressed women wearing good shoes, silk stockings, latest model dresses. Who—I asked myself—paid for all these expensive things? Surely not the women out of their earnings as shopgirls, clerks, typewriters, stenographers, or cooks? For their wages were hardly enough to pay their board. I soon found out that it was the numerous class of *Schiebers*—war profiteers—who so lavishly paid for the socalled love bestowed upon them by their *lady friends.* I merely state this, with no intention of casting any reproach on the *lady friends,* nor on their *Schieber* friends. The girls saw all the luxury displayed by their sisters of the upper classes, wives of bankers, manufacturers and rich merchants, kept in great style not by the incomes of their husbands alone—such incomes could never have borne that tremendous expense—but by their one or more socalled gentleman friends. The display of furs, silks and jewels by those Messalinas in the boxes of the grand opera, at concerts, theatres and American barrooms, was outrageous. How should a poor girl —not having enough to eat at home, or fuel to keep her from freezing—not have fallen prey to such temptations if she had beauty to sell. The misery and suffering of many years of war, the loss of fathers, brothers, and sweethearts turned the girls and boys into a lot of pleasure maniacs. Their only aim was to get joy out of life at any price!

The gentleman friends most sought after were the refined looking foreigners, the swell members of the various missions sent to Vienna to exact the war reparations or to help the suffering poor. Dollars, francs and lire were the golden calves adored by the weaker sex. I was appalled at the spread of sexual diseases and sexual perversities in a community which hardly knew, before the French and Italian invasions, what perverted sexuality meant.

In this connection I might mention that legal abortion has been brought before the congress several times and laid on the table. Nevertheless, abortions are practised in Vienna nowadays by nearly every surgeon or gynecologist—a thing scarcely known in prewar times. I am told, in fact, that it is a considerable source of income. The city authorities acquiesce, because they realize that there is not enough food for the babies already here.

Vienna always was an easygoing, pleasure loving city, as the great poet Arthur Schnitzler classically depicted it in the *Anatole* and other works. But what the moral squads unveiled was not half so bad as what the clinics published in the way of statistics.

I do not, however, wish to cast any stones upon the war profiteers either; many of them I came to know personally. They are a set of physically healthy individuals, who have had the wits and grit to take quick advantage of an economic constellation. They had the brains to adapt themselves instantaneously to changed surroundings and conditions, and because their efforts were successful, they were hated and looked down upon by those who remained inactively highbrowed and were still relying upon their social distinction, inherited from their monarchistic fathers. A large number of these aristocratic pilgrims went under; another part—following the law of survival of the fittest—took up useful jobs and saved themselves.

The most pitiable of all were the academic middle classes, the real pillars of former socalled culture; they were penniless, and still refused to do manual work. For instance, I happened to take up quarters in a villa belonging to a former chief of the health bureau of one of the provinces of old Austria-Hungary. This man, whom I knew thirty years ago as an able assistant at one of the renowned internal clinics, was glad to come back to Vienna and accept a minor position in the health bureau in Vienna. Vienna has had to employ many thousand of government employees of the former monarchy to keep them from starving, because the new, independent states would not retain them; hence the incredible number of two hundred and fifty thousand government employees for six million people! His two girls, eleven and thirteen years of age, did not—out of pride—take the good square meal provided at one of the American kitchens for school children, but ate cooked beets twice a day at home, all the week round; the odor permeated the house. And their mother—the daughter of a general—would try to contribute to the household expenses by giving one or two singing lessons a week. The house was as filthy and dirty as a tenement house, because the lady of the house would not do menial work, nor could she pay for a capable servant; and when spring came, the garden was not spaded for potatoes and vegetables, but the one little girl would run about all day with a tame hen in her arms, and the other little girl with a lapdog.

In generalizing such helplessness, some explanation may be found for the misery of the middle classes, though I grant that I have seen others do hard work, home industry, *petits points,* weaving gobelins, and support themselves decently by the help of the *Werkbund*—a sort of woman's exchange.

THE NEW ATTITUDE.

While the Viennese people were always a happy go lucky set, an easygoing lot, or, as they term it here *gemütlich* (a word for which I can't find an exact translation), the disaster which has befallen them in the shape of the dismemberment of the old monarchy, cutting off the rich provinces which once supplied Vienna with all the necessities of life, has rendered them entirely helpless. They are not capable of aiding themselves; they always hope something will happen to save them, that help will come from the outside. To me their *Gemütlichkeit* always implied mental laziness, *Denkfaulheit,* as I often pointed out to my old school friends here. Take, for instance, their charity work. A case in point is their life saving station (*Rettungsgesellschaft*), a sort of ever ready ambulance service used for picking up accident cases on the streets or in the homes, and quickly transferring them to the respective departments of the various hospitals, after giving first aid. This institution, founded by a really magnanimous benefactor, Dr. Munk, some forty years ago, has proved of great value to the entire population. It is supported by private charity. When it was in great financial distress a year ago—and this happened quite often even before the war—all the papers appealed for contributions. Little help was forthcoming because everything was left to volunteer subscriptions and the newly rich were not yet aware of their plain duty toward the community in which they had amassed their fortunes. *Noblesse oblige* might now be changed into money obliges, money having taken the place of former nobility. The institution came near closing its doors. Charity work here is not organized as it is in the United States. I made an appeal for one dollar from each member of the American Medical Association of Vienna, and in five minutes' time had some forty dollars, which we delivered to the institution. Incidentally, we made a few public remarks as to the necessity for organizing their drives better. Later we heard remarks like "Those Americans should not talk so much. What's a dollar to them?"

As regards their methods here, a few prominent people contribute, have their names mentioned conspicuously in the papers which accept the contributions—and the bulk of the silent misers entirely fail to contribute.

Take another instance. The poor of the city need fuel; the municipal authorities distribute blanks to the porters of every house, and on these blanks the inhabitants of the houses are supposed to put down their names and the sums contributed. In the house where I lived I noticed on the blank the names of people who were immensely rich, owning factories in Czechoslovakia, with one thousand and two thousand kronen respectively opposite their names. And the price of a streetcar ride was fifteen hundred kronen!

During the war, scandals took place in connection with the Red Cross drives; people with high sounding names had absconded with money collected for the poor wounded soldiers. This unwillingness to help themselves has become so rampant that Mr. Avenol, the delegate from the League of Nations, made the public statement a few days ago that Vienna has done short of nothing in the line of reducing the large list of State employees. Half of the quarter million State employees are, I wager to say, merely salaried loafers. By way of illustration, I may mention that there was a small pile of dirt on the street I pass through. Four men were needed to carry it away, one pulling the handcart, another sweeping, a third shoveling the dirt into the cart, and a fourth giving orders! The same system prevails in all branches of the administrative machinery. Unless the economy dictator is invested with absolute authority, he will have a hard time combating the various political bosses, who back thousands of those paid loafers.

There was another thing which struck me from the first day I entered Vienna—the people in the street cars, palefaced and shabbily clothed, sat quietly and read books, but never laughed or talked. This was very different from the times before the war! Then, you could always hear them chat or laugh, or crack some funny jokes; now, nothing of the sort. They were like cattle being led to the slaughter house. They were irritable, at the same time; any little platform incident, such as one man stepping on the toes of another—due to the crowded condition of the cars—would start a vehement quarrel. To the physician their skin appeared to be of a peculiar paleness and transparency—no redcheeked faces, no barrelshaped men or women. One of the professors of internal medicine, of international fame, told me that during the last years of the war, when there was such scarcity of meat, Graves's disease so prevalent before, entirely disappeared. He saw no case for years at his clinic; but later on, when meat was again obtainable, the disease reappeared. He also quoted Professor von Noorden, who wanted a chlorosis patient to demonstrate to his students, but was unable to find even one among hundreds and thousands of dispensary patients. Chlorosis must surely depend upon virginity, he thought, so the former disappeared with the latter!

On my frequent walks through the suburbs, out to the beautiful bills surrounding Vienna, I noticed many schoolchildren, well fed, well dressed all carrying tin pails containing their dinner, given them at the American Relief Stations established in every school. This American Mission has fed four hundred thousand schoolchildren a day, for the last two years. Such goodlooking, welldressed youngsters, in such numbers, I never saw in the times before the war. But this story has a reverse side. While working in the clinical wardrooms, seeing many a case of liver cirrhosis, Bright's disease and early arteriosclerosis, I naturally always inquired about the quantity of alcoholic beverages ingested in the course of a day. "Well, Doctor," came the answer, "I don't drink much lately. I can't afford it." "Tell me how much, anyway!" "Well, only eight to ten pints of wine—before, of course, I had more money and drank as many quarts."

These patients were the fathers of the youngsters I had admired in the suburbs. The middle class man, lawyer or doctor, could not afford to drink one glass of beer a day, but this workingman, whose three to six children were being taken care of by the relief action, could well afford to spend his earnings in drink; so much the more so because his wife frequently took in washing and thus supported the household. Those very laboring classes are the best-paid people in Vienna. A shoemaker earns four million kronen a week, a metalworker six millions, while many a practising physician of thirty years' experience will hardly earn one to two millions a month. And if the physician complains to the workingman, his patient, about the poor pay, the latter will ask, "Well, Doctor, why did you not learn something decent?" (authentic story). On hot summer evenings almost everybody in former years used to go to the suburban vineyards and take supper out in the open, to listen to the lovely Viennese popular songs and to drink a glass or two of *Heuriger* (wine of last year's vintage). Now, one sees the working classes only, the middle classes being unable to pay the price.

The American tourist might easily get the impression that his nation is admired and beloved above all others coming here. Yes, to some extent, as long as he is willing to spend his dollars freely. But right down in their hearts the people hate and loath the American. I never could understand this attitude, in the face of the tremendous, good work Hoover and all our other relief societies have done over here. A little incident that occurred during my membership in the Physicians' Club, to which most of the lecturers (*docent*) and professors of the Medical Faculty of Vienna belonged, elucidated matters to me more plainly. While taking my five o'clock coffee with a number of my former schoolmates—a good many of them now lecturers and professors at the faculty—one of them asked me why Americans don't do this or the other thing for Austria, and so on. To my reply that I thought Americans had done a lot more for Vienna than any other nation, came the retort, "They could do ten times more and still not feel it. And if they did a hundred times more, they could never undo the wrong they have done us by getting into the war. We should have won the war if it had not been for the Americans. They have brought on us all the misery we are suffering now; they did it out of greed, not to save us from tyranny."

It was plain to me now that their cringing gratitude, shown in public for every little gift coming from America, was the fawning of a beaten dog. It was positively disgusting to me to listen to the "Hurrahs!" raised at the weekly medical meetings every time the hundred or thousand dollar gift of this or that American was announced. I knew the current which ran underneath those hurrahs. In their attitude towards everything American, these academicians differed not a bit from that of two little girls, clad in rags, to whom I spoke on the first autumn day of 1920, on one of the streetcars leading to the woods of Vienna. These undernourished girls, twelve and fourteen years of age respectively, were going out to gather wood for the winter. When I asked them if they got enough to eat at the American Relief Station, they replied, naïvely, "We would not eat that stuff. We found a long hair in the beans! We don't need the Americans, it's the *Sheenies* who make us poor!" The young children, of course, spoke as their parents did. And when told that the good clothes they had at home, as well as the good food which was given them, were to a great extent contributed also by the savings of American Jews, they answered, "Oh, yes, those are different Jews!"

This brings me to the anti-Semitic movement in Vienna. While I was aware of the fact that wherever there are Semites, there must also be anti-Semites—while I knew that for decades past, Vienna has had a political party, called the Christian-Socialists or German-Nationalists or what not to cover the name of anti-Semites, it was brought home to me in a new and poignant manner during my first call on Professor Eiselsberg, a man known all over the world for his surgical achievements. He received me with the utmost cordiality and affability, led me to his private room at his clinic, and exclaimed, after the usual conventionalities had been exchanged, "You see, my friend"—pointing to the examination certificates of six students whom he had just examined—"this is the cause of all our misery. Out of six students, four are Eastern Jews." I was at a loss to understand how a scientist of his standing could pass a fair judgment upon the surgical skill of students, if the race to which they belonged was more important to him than their qualifications. And this is the man who was in charge of the relief work for the three thousand five hundred physicians of Vienna, seventy per cent. of whom are Jews.

I may here mention a funny story that was told me about this old man. During the war, Dr. G., one of his pupils, was reported to have been killed in action. Professor Eiselsberg was very sorry about it, and stated that Dr. G. was the only Jew whom he had intended to make his assistant. Later, it turned out that Dr. G. had not been killed, but was captured in Russia, and—*nolens volens*—Professor Eiselsberg had to make him his assistant on his return from captivity. Dr. G. now has the distinction of being Eiselsberg's only Jewish assistant—the only Jew at the surgical clinic.

Similar conditions exist at most of the other clinics. It is very difficult for Jews—no matter what their qualifications and scientific achievements may be—to obtain appointments as clinical assistants, lecturers or professors. In past years many of the most able members of that race took to baptism in order to gain admission to a career which had been pronounced, by law, to be open to any citizen without distinction of nationality, race or creed. While I never could understand how a few drops of water could change the biological racial instincts and characteristics, it evidently did help many Jews to become internationally famous as professors at the Vienna University. We need only recall names like Sonnenfels, Glaser, Bamberger, Kaposi, Mautner, Lieben, Fleischl v. Markow, Stoerk, Oser, Seegen, Dittel, Goldschmiedt, Buckerkandl—men of Jewish extraction, to whom statues have been erected in the Hall of Fame in the beautiful university building. In memory of Sonnenfels, the descendant of a Jewish rabbi named Lipman, another statue has been erected in front of the City Hall—evidently out of respect for his untiring efforts to do away with the medieval instruments of torture. Then there have been other Jews at this university, to whom no monument has as yet been erected, but who certainly do possess one *aere perennius* in the hearts of scientists all over the world: Theodor Gompers, Josef Unger, Eduard Suess, Budinger, Szanto, Hirschfeld, Grünhut, Wiesner, Politzer, and Zeissl. Julius Wiesner, the plant physiologist, was once rector of the university. H. S. Chamberlain, the highest authority on racial anti-Semitism, dedicated his book on *Foundation of the Nineteenth Century* to this Jew. The three renowned brothers, Adolf, Franz and Siegmund Exner—two of whom served as rectors of the university—had a Jewish mother.

It cannot be denied that Jews have played an important rôle in the development of the country's civilization, and have pressed themselves to the front in many branches of science instead of leaving precedence to the non-Jews. Josef Unger, Glaser and Grünhut had great influence upon the development of jurisprudence; Steinbach regulated the Austrian money system; Kelsen created the Constitution of the Austrian Republic, while Friedjung, Pribram, Josef Redlich, Wertheimer and Charmatz have well nigh monopolized the history of latter day Austria. Josef Redlich is considered the classical teacher of English constitutional administration, and is known to every American.

The only Austrians who ever obtained the Nobel prize were Jews—the pacifist Fried, and the ear specialist Bárány. For the latter, there was no place at the Vienna University, so he accepted a chair at a university outside Vienna. Think of the founder of otiatry, Politzer; of Winternitz, who originated hydrotherapy; of Stricker, who created experimental pathology; of Dittel's urology; of Freud's psychoanalysis; of Benedict the neurologist! Think of Behring, the discovered of diphtheria antitoxin; of Ehrlich, who discovered salvarsan, and we must all admit that Jews—ever since their first healer, Jesus, became known—have given proof of a peculiar racial instinct for the art of healing the sick.

(*To be continued.*)

LATIN AMERICA LETTER

Balboa Heights, C. Z., *March* 25, 1923

SANITATION IN THE CANAL ZONE.

The Panama Canal, a strip ten miles wide running from northwest to southeast across the Isthmus of Panama, has excellent sanitation, as have also the terminal cities of Cristobal-Colon and Balboa-Panama, but so far as the interior of the republic is concerned, relatively little has been accomplished. The central government, it is true, has maintained a series of small hospitals and dispensaries in the capitals of the provinces under the direction of physicians who are known as *medicos officiales,* and the International Health Board has established an uncinariasis service, but there is no national health agency and no plan of a concerted health movement. Vital statistics are rather indifferently collected and morbidity data almost not at all; many localities are scourged with malaria which renders their inhabitants subnormal from infancy to the grave; ankylostomiasis and other parasitic intestinal infections are prevalent and widespread; from time to time alastrim smallpox sweeps through the provinces and many of the oldest cities in the New World have degenerated into filthy, insanitary hamlets. But while little direct attempt is being made to meet these conditions, they are being improved, not by intention but as a byproduct resulting from the installation of good roads with increased opportunities for social and commercial intercourse.

The change which has taken place as a result of doing away with the isolation in which the interior communities formerly lived is almost unbelievable. Not only is civic pride being awakened and municipal cleanliness being increased, but cities which were centuries old enemies are now erecting sanitary cooperative abattoirs. Sanitary markets are being built; sanitary privies are being used; public water and lighting systems are being installed. The economic benefits of improved opportunities for the shipment of agricultural products are manifest in the increased prevalence of shoes—the arch enemies of the hookworm—and the way in which the automobile truck is supplanting the oxcart. It is planned to connect Porto Bello with Colon by a modern road and a movement is now on foot to induce the United States to erect a wagon bridge across the Canal so that the western half of the Republic will not be cut off from the capitol by American property. That this would be of enormous benefit to the health and prosperity of Panama there can be no doubt, since the results of what has already been done are so apparent.

GEOGRAPHY OF PANAMA.

The geography of the Isthmus of Panama is extremely puzzling to most visitors and since every year the number of physicians touring the Canal Zone is increasing, it seems as though some mnemonic expressed in medical terms might prove useful. If a person imagine himself lying on the world with his toes at the South Pole and his left arm reaching up to touch the United States, his body will take the relative position of South America, his left arm that of Central America, and his left clavicle that of Panama. The Isthmus is clavicular in outline and joins with Colombia—the sternum—to the eastward and Costa Rica—the left shoulder—to the westward. But it is a clavicle which has been fractured and on its posterior surface there is a callous—Punta Mala. At the point of greatest convexity is the northern end of the Canal—the Isthmus runs east and west—and at the point of greatest concavity and a little nearer the midline of the hypothetical body is the southern end. At the north are the two coterminous cities, Cristobal Colon (Christopher Columbus) and at the south two more, Balboa-Panama.

DR. BEEBEE'S EXPEDITION.

Among those who composed the exploring party which went through the Panama Canal on the Yacht *Noma* on March 23, 1923, was Dr. James F. Mitchell, of Washington, D. C. The expedition is headed by Dr. Beebee, curator of birds of the Metropolitan Museum of New York, and will visit the Galapagos Islands for the purpose of making studies and collections of both marine and terrestrial life. The yacht will return to Balboa by way of Guayaquil about May 1st.

FOOT AND MOUTH DISEASE IN CENTRAL AMERICA.

On account of the reported prevalence of foot and mouth disease in Honduras and Guatemala and the contiguity of Salvador, Nicaragua and Costa Rica to those countries and the reported overland interchange of cattle between them, the chief quarantine officer, Dr. W. C. Rucker, issued an order on March 14, 1923, prohibiting entry into the Canal Zone or the cities of Panama and Colon either permanently or for transshipment of certain animals and things liable to carry the infection.

PANAMA MEDICAL ASSOCIATION.

The program of the 196th meeting of the Panama Canal Medical Association, which was held on March 23rd at Ancon Hospital, was supplied by the Board of Health Laboratory Staff, a valuable paper on Laboratory Findings from the Typhoid Group Over a Period of Fifteen Years being presented by Dr. Wesley C. Cox and discussed by Dr. D. P. Curry, Dr. L. B. Bates, and Dr. V. H. Cornell. The schedule of programs for the balance of the year is as follows: April, Surgical Service at Ancon Hospital; May, Health Department; June, Santo Tomas Hospital Staff at Santo Tomas Hospital; July, Panama Canal Department, Medical Corps, United States Army at Quarry Heights; August, Medical Service at Ancon Hospital; September, Herrick Clinic at Panama Hospital; October, Corozal Hospital Staff at Corozal Hospital; November, Staffs of Colon and Good Samaritan Hospital at Colon Hospital; December, Medical and Surgical Service at Ancon Hospital.

Book Reviews

LIFE OF LAWSON TAIT

Lawson Tait, His Life and Work. A Contribution to the History of Abdominal Surgery and Gynecology. By W. J. Stewart McKay, M.B., M.Ch., B.Sc. New York: William Wood & Co., 1922. Pp. xii-579.

The author's aim in this biography was to show that his teacher, Lawson Tait, was the founder of modern abdominal surgery, at the same time recording the steps in the evolution of gynecology. The work of Tait is correlated with that of his contemporaries. With a book of this sort a true perspective of former years may be gained and it is an illustrious example of how the history of medicine and surgery may be learned by reading the biographies of the most prominent figures of a certain period. Owing to the author's close association with Tait, he was enabled to give first hand information, based on personal observation of the master and his work.

Tait's contribution to surgery include an active campaign against the prevailing excessive hospital mortality; the first deliberate removal of the ovaries for pain and a study of the diseases of the ovaries; abdominal hysterectomy; the treatment for chronic inversion of the uterus; cholecystotomy; the V and H methods of doing perineorrhaphy, in the latter of which he emphasized the necessity of suturing the sphincter muscle in complete rupture of the perineum; a uterine elastic dilator; hepatotomy for hydatid cyst; the intraperitoneal treatment of the pedicle of the ovarian cyst; pelvic drainage in suppuration and its pathology; the pathology of ectopic pregnancy and its treatment; the surgical treatment of chronic inflammation of the uterine appendages; an artery forceps; ovariotomy; work on cyst of the urachus; the modern principles in the surgical treatment of ectopic pregnancy; some advanced ideas on antisepsis and aseptic surgery and gallbladder surgery. Tait was a prolific writer and he engaged in many heated controversies on the moot surgical questions of his day. His influence on American surgery is traced. The second part of the book deals with his method of operating and some anecdotes and events in his private life.

On the whole, this book will prove to be an excellent pastime for the leisure hours of the physician: it is written in an interesting style and the material is instructive. There is a dearth of works such as this, which serve a purpose all their own. The living personality of the master is reproduced.

EFFICIENCY

The Successful Physician. By Verlin C. Thomas, M.D. Philadelphia and London: W. B. Saunders Company, 1923, pp. 303.

In these days of intense competition, not only among physicians themselves but between the regular physician and the practitioners of all sorts of cults, pathies and isms, the publication of books like this is highly desirable and even necessary. Dr. Thomas has aimed to provide a guide book for the traveler along the highway to professional success, and points out what he considers the straightest and best paved roads to the goal of the medical practitioner.

The author emphasizes the fact that a book of this kind cannot make the blunderer efficient, nor can it make the misfit fit. It can, however, help the reader to avoid the errors that others have made before him, inasmuch as it is based on a large experience. The young physician entering on the practice of his profession realizes but too quickly that his real professional life differs essentially from his career at college and in the hospital. The world expects and demands efficiency and makes no allowance for youth and inexperience. He finds very quickly that it is necessary for him to know how to meet his patients and how to handle them; he must familiarize himself with accepted professional methods of practice and follow along certain lines of modern life which apply to all social activities, but especially to the physician.

This volume is intended to furnish these teachings, and contains a vast fund of information and many suggestions which must inevitably tend to make the physician a more fully rounded and thoroughly up to date member of his profession and of the community in which he lives. Special articles by experts in life insurance, investments, legal matters, court practice, office systems of accounts, etc., add materially to the practical character and value of the work. The volume can be commended as a most useful contribution to the practical side of medical practice.

ANATOMY OF THE BRAIN

Anatomie des Grosshirns. Foranalytische Untersuchungen. By Dr. med. E. Landau. Mit 66 Figuren im Text. Bern: Ernst Bircher Aktiengesellschaft, 1923. Pp. viii-146.

With the author we thank the publisher of this book for its attractive form, which is most suitable for enlisting and holding the reader's interest. For its material is well worth such an introduction. Landau's own clear, well arranged presentation also stands in the service of a comparative study of great value. He has discussed the formation of the brain and cranium and their mutual relationship, has submitted the development of the convolutions and fissures of the brain to an extended comparative examination. The basal ganglia have been likewise the subject of study and the development of the island of Reil as it has been sought out in many lower animal forms. Work of other investigators with their theoretical conclusions has been freely taken into consideration. The author has adhered to his guiding principle that only observable facts form sure morphological ground. Causes must be considered only as theoretical, to be treated therefore with fearless willingness to modify one's conception of them or simply when necessary to leave them to the still unknown. He makes a fruitful comparison of older and more recent points of view in regard to biological questions which arise out of his researches. He is content to leave certain things in question, but insists upon his belief that developing forms do not proceed directly one from another but rather together each in its own way from a primitive general type. It is well to forget for a time that "ontogeny repeats phylogeny" and get back to a more varied range of facts which dispute the literalness of that dictum.

PSYCHOLOGY OF RELIGION

An Introduction to the Psychology of Religion. By ROBERT H. THOULESS, M.A. New York: The Macmillan Company, 1923.

An attempt to study the psychology of religion by an inclusion of the modern psychological methods of approach. The writer shows a wide and superficial knowledge of dynamic psychology and a familiarity with modern socalled conservative Christian religions. Primitive religious impulses are given inadequate consideration. Psychopathological impulses are attributed to socalled mysteries and an attempt is made to prove that more conservative religious beliefs are true sublimations of libido impulses. The libido which Thouless prefers, naturally, is the one described by Jung. Throughout the work a sincere effort has been made to face psychological problems as presented by the most radical schools. The book is well written and will undoubtedly find favor among many who are inclined to be liberal minded.

STUMPS AND ARTIFICIAL LIMBS

Artificial Limbs and Amputation Stumps: A Practical Handbook. By E. MUIRHEAD LITTLE, F.R.C.S., Eng. With 267 illustrations. Philadelphia: P. Blakiston's Son & Co., 1922.

The reader of this work will undoubtedly marvel at the fact that it is possible to make so interesting a book on so prosaic a subject as stumps and artificial limbs. The author has succeeded in presenting his subject in a manner which is at once instructive, illuminating and fascinating. He has not attempted to offer a complete and encyclopedic work on the subject, but has contented himself with an exposition of British practice with few references to foreign methods, which, he believes, differ little and often not advantageously from British methods. In a book dealing with stumps and artificial limbs, there is always present the danger of converting the work into a limb makers' catalogue; but in the present volume, the author having had this possibility in view, has tried to avoid it, with a considerable measure of success. On the whole, the work is one which must be of considerable value to the orthopedic surgeon as well as to the unfortunate individual who requires the artificial limb. It can be followed with safety and confidence by those who are interested in the subject with which it is concerned.

JAPANESE RESEARCH

Mitteilungen aus der Medizinishen Fakultät der Kaiserlichen Universität zu Tokyo. xxviii Band 1. Heft. Tokyo: Verlag der Kaiserlichen Universität, 921. Taisho x. Pp. 197.

A. Imamura reports his investigations on the metabolism of the Japanese wild turkey under varying conditions of life, especially during hibernation. The glycogenic function of the liver, muscles and the rest of the body and the blood sugar, fat and respiratory quotient both during activity and during hibernation are carefully studied. Tomizo Watanabe reports a case of microcephalus, in which the important changes in the brain, both gross and microscopic, were studied in detail. S. Tachigara reports on the biological significance of hyperglycemia after the intravenous injection of typhoid bacilli in rabbits. He investigated the changes in temperature, the changes in the blood sugar concentration after the intravenous injection of the typhoid bacilli in normal and immunized animals and after the intravenous injection of Witte peptone, the changes in blood sugar concentration after the splitting up of the peptone in the body by the intravenous injection of heterogenic erythrocytes, the significance of blood sugar in relation to the splitting up of the typhoid endotoxin and anaphylotoxin from the injected typhoid bacilli, the results of injecting large amounts of typhoid bacilli into rabbits rendered hyperglycemic, the gycolysis of the blood after the injection of typhoid bacilli, the development of nucleated erythrocytes in the rabbits rendered hyperglemic, the effect of glucose on the complement and the biological significance of the blood sugar.

FRIEDMANN'S TURTLE BACILLUS

Die Friedmann Methode. Kritisch Beleuchtet unter Berucksichtigung der gesamten Friedmann-Literatur. von DR. VICTOR BOCK. Mit einem Vorwart von Geh. Rat PROF. DR. F. JESSEN-DAVOS (Schweiz). Leipzig: Verlag von S. Hirzel, 1922.

The book represents a summary of all of the literature which has appeared concerning the turtle bacillus treatment of Friedmann. It is called a critical review but actually confines itself to uncritical praise of the remedy. The treatment has been sufficiently discredited by the leaders in the study of tuberculosis in Europe and America to make further discussion unnecessary.

X RAY THERAPY

Strahlentherapeutische Monographien aus dem Frankfurter Universitäts Institut für Physikalische Grundlagen der Medizin. Band I: Zur Therapie des Karzinoms mit Röntgenstrahlen. Vorlesungen über die Physikalischen Grundlagen der Tiefentherapie. Von o. ö. Prof. Dr. Fr. Dessauer. Zweite verbesserte Auflage mit 32 Textfiguren. Band II: Dosierung und Wesen der Röntgenstrahlenwirkung in der Tiefentherapie vom physikalischen Standpunkt. Von Prof. Dr. Fr. Dessauer; mit 6 Textfiguren. Band III: Biologische Grundlagen zur Strahlentherapie der Bösartigen Geschwülste. Vorlesung gehalten von Professor Dr. W. Caspari, Leiter der Abteilung für Krebsforschung am Staatsinstitut füe Experimentelle Therapie in Frankfurt a.M., mit 1 Kunstdrucktafel. Dresden and Leipzig: Verlag von Theodor Steinkopff, 1922.

This series of monographs on röntgenotherapy, written by the well known Dessauer and his associates, is exceedingly valuable. They are a series of lectures given by these writers and were published in response to a demand by their friends and pupils for a short and intelligible treatise on the subject. Three volumes have already been published: the first volume consists of four lectures on the physical bases of deep röntgen therapy of carcinoma and an appendix describing the author's (Dessauer) publications from 1905 to 1914 and a bibliography of articles written from 1915 to 1921. The second volume, also written by Dessauer, treats of the dosage and nature of the action of x rays in deep therapy and is very practical. In the third volume Caspari discusses the biological principles of röntgenotherapy of malignant tumors. The fourth volume (not yet published) is to be written by E. Pohle and Jarre and is intended to discuss the practical method of treating carcinoma. Additional volumes will be published later.

STEKEL

The Homosexual Neuroses. By Dr. William Stekel. Translated by James S. Van Teslaar, M.D. Boston: Richard C. Badger, 1922.

Sex and Dreams. By Dr. William Stekel. Translated by James S. Van Teslaar, M.D. Boston: Richard C. Badger, 1922.

These two new translations of Stekel will be welcomed by students of human behavior. *The Homosexual Neuroses* is a continuation of *Bisexual Love* which appeared some time ago (Badger) and is one of the best things Stekel has done. Stekel is always stimulating and if one can discount his impetuosity, which at times leads him to be dogmatic, much can be got from a study of his better things. Many of his works have appeared in English previously but most of these were his attempts to popularize the study of modern psychopathology. These earlier translations are not altogether sound in their deductions and it is fortunate that his more worthy works are now appearing.

Sex and Dreams gives a series of sketchy case histories and some of the dream material presented. The interpretation of the dreams may be criticized on the ground that no adequate reason is given for the conclusions presented and that other interpretations may have been overlooked. This latter point is one that can be taken regarding any interpretation of dreams that may be cited. Nevertheless there are points of great value.

In Stekel's discussion of homosexuality, he takes the extremely logical stand that it is a normal biological process being an integral part of the bisexual picture shown in normal development. He does not include another important mechanism—that of primary identification as the outcropping of Freud's most fundamental ego, libido or narcissistic component. It is well to remember that human behavior is exceedingly complex and that no one thing is responsible for any attitude that may be taken. If Stekel's works are read from this critical approach they will prove of value. The only danger lies in falling into his fallacy of attributing certain reactions to definite and limited causes.

PLAYS OF PESSIMISM

The Waltz of the Dogs. By Leonid Andreyev. New York: The Macmillan Company, 1922.

East of Suez. By Somerset Maugham. New York: George E. Doran, 1922.

There is little of sunshine or goodness in Andreyev's dramatic play *The Waltz of the Dogs.* The plans of progress, the attempts at construction, formulated by those portrayed in the play all founder on the rocks of evil, cupidity and sadistic lust. Not a worthy character remains in the lot when the final curtain falls, from the best intentioned to the ones who were chronic rotters. Evil grows from evil, evil grows from good. This seems to be the final philosophy of the gloomy Andreyev. A fair concept of the Oriental in the Slav cannot be obtained here.

* * *

Maugham weaves his plot for *East of Suez* in that most Oriental city Peking. The danger of a play of this kind is that a people may be judged from the portrayal of certain dramatic, psychopathological characters. This danger exists because we must form our opinion from works such as Maugham's which serve to portray countries and races symbolically. We do not have opportunity to study any group of persons in these far off countries. We must therefore refrain from concepts which may tend to prejudice. The dramatist naturally cannot be blamed for his selection of incidents for he like the newspapermen seeks the unusual. It would be just as fair for a dweller in a far distant country to judge us by our most colored daily papers.

Maugham's play is tense, full of thrills and action. It is filled with destructive goals just as is Andreyev's play. Here, too, evil feeds evil and evil destroys the good. The Oriental differs little from us. This we may best prove by his mental states, he has the same conscience we have—the same loves—the same hates. He differs from us in certain minor standards, which have been established by him and by us to conform with certain external conditions. Yes—he has the same emotions and, more important, suffers from the same mental diseases. This, after all, shows us how nearly alike we all are underneath our externals.

DREAMS AND REALITY

The Goose Man. By Jacob Wassermann. New York: Harcourt, Brace & Co., 1922.

A reviewer spoke of this book somewhere as the effort of genius to live beyond the dictates of the world. It is, and it isn't. Genius creates its own world, but rarely tries to live in it. The unhappy Gooseman, Daniel Nothafft, longs for a little of the world's genuine love and happiness. It is denied him. His genius receives the tacit blame. The living, breathing world that Wassermann pictures with such appalling veracity is befuddled by Nothafft's constant dreams. Reality has no place in it. All the lives in the book jar and beat against the sharp angles of reality like chips in a swirling current—and this makes the book singularly true and singularly valuable to the student of human motives.

This vast symbolic representation of the ever present conflict between reality and phantasy is not easy to put within hard and fast limits. It is a creation, a source of never failing new thoughts, appreciations. One finds from day to day new applications, new meanings. It enthralls with the touch of the master. And we can only dimly understand.

When it comes to the concrete figures of our weaknesses, foibles, vices, with which every city is filled, we can understand them only too well. A great many pathological characters interweave this story. There are as many about us every day but we are not trained to see them; to see those phases in them that have warped them from companionship with reality. Daniel Nothafft reeling from one stunning blow after another, alone retains his creative sanity in an insane world. To his fellows he is, of course, the only unbalanced member of the community. Thus is it always.

This book is unusually valuable to the physician because of the commonplace traits which are brought into such sharp relief that they appear as they really are—dangerous abnormalities. They border so closely upon what we are accustomed to expect, that our vision has become dimmed. It needed this ruthless emphasis to show us what reality, hidden beneath the ever protective disguise of outward appearance, actually is.

Medicoliterary Notes.

In the *Nation's Health* for March, Dr. Douglas A. Thom, now of Boston, has an article on Habit Clinics for Child Mental Problems. These clinics aim to treat the misunderstood, often asocial child, before he has a chance to undermine the foundations of family life.

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The *New Republic* has evidently realized the great need for medical information of the proper kind in suitable form for popular consumption. The series of excellent articles that have been running for several weeks by Nicholas and Lillian Kopeloff is helping to supply this need. The last is a discussion of the drug evil in the *New Republic* for March 7th.

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An interesting account of medical progress in Samoa since the war is given by one of the medical staff in the *New Zealand Medical Journal* for February.

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The State Charities Aid Association is distributing an appeal that those who approve of the Antin-Cole Bill, now pending in the Legislature, make this fact known to the Senator and Assemblyman who have sponsored this bill. It makes provision for State aid for special classes in the public schools of New York State. All who are interested may obtain the text of the bill and a memorandum in its support from the State Charities Aid Association, 105 East Twenty-second Street.

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Health Equipment in Framingham, Then and Now, is the title of an article in the *Nation's Health* for March by Dr. Donald B. Armstrong, executive officer of the Community Health and Tuberculosis Demonstration, started in Framingham, January 1, 1917. Morbidity from tuberculosis has decreased fifty-five per cent. and the general death rate sixteen per cent.

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In the *Atlantic Monthly* for April, George Arliss, the actor, writes on the psychology of play audiences. Another article of interest to the psychologist is the Behaviorism of Our Grandmothers, by Elizabeth A. Drew.

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Two addresses delivered at the Public Health Exposition in New York City in January are reprinted in the *Monthly Bulletin of the Department of Health* for February. These are both entitled How Sanitation Aids Public Health, and are by Dr. Alonzo Blauvelt and by Richard P. Walsh, chief sanitary inspector.

* * *

The *Century* for April contains a number of unusually good articles and stories. Among these are the opening of a novel by Willa Cather, A Lost Lady; The Revolt of the New Immigrant, by Maurice G. Hindus, who believes that the attitude of the European peasant immigrant to this country is not the result of old world or alien influence, but the outcome of the long and painful process of socalled Americanization, which he is not ready to receive; The Ku Klux Klan, by Frank Tannenbaum; Women's Part in the New Rennaissance, by Lucie A. Zimmern; The English Lecturer in America, by S. K. Ratcliffe, who has himself been lecturing for several years before audiences of American intelligentsia, and Salvation by Jazz, by Carl Van Doren, editor of the magazine, who dubs the poet, Vachel Lindsay, an evangelist in verse.

* * *

Dr. Arnold Gesell, professor of child hygiene and director of the psychoclinic at Yale University, has an article on Feeblemindedness, State Policy and Control, in the *Nation's Health* for March. The solution proposed is proper vocational and supervisory methods.

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A law in Chili requires factories employing fifty or more women to provide care in day nurseries for the children of the operatives.

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In *Current History* for April, Prof. Roy Malcolm, of the University of Southern California, writes on the Problem of the American Born Japanese. Japanese children born in the United States he has found to be better physical specimens than those born in Japan, and to exhibit a special aptitude for study, and for adoption of American customs and standards.

* * *

The *World's Work* for April contains several articles dealing with interesting personalities. Among these are Some Encounters with Kings and Queens, by Sir Philip Gibbs; From the Home to the House, by the Viscountess Astor; and Paderewski, a Great Man, by Silas Bent.

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The United States Public Health Service is conducting a study of rural malaria in Yazoo County, Miss., which has furnished such interesting data on the use of creosote oil as a mosquito repellant that a preliminary report has been published in *Public Health Reports* for March 9th. The writer is Dr. C. P. Coogle.

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A legislative act passed in Denmark on July 10, 1922, contains provisions concerning the employment of children and young persons in handicraft and industrial transport undertakings. Among these provisions are that in industrial undertakings no children under fourteen shall be employed at all, and that no young persons under eighteen shall be employed at night work.

New Publications Received.

VITAL STATISTICS. By GEORGE CHANDLER WHIPPLE. New York: John Wiley & Sons, 1923.

PRACTICAL PHYSICS. By J. A. CROWTHER, Sc.D., F.Inst.P. London: Henry Frowde and Hodder & Stoughton, 1922.

CLINICAL LABORATORY METHODS. By RUSSELL LANDRAM HADEN, M.A., M.D. St. Louis: C. V. Mosby Co., 1923.

ORTHOPEDIC SURGERY. By SIR ROBERT JONES, K.B.E., C.B., and ROBERT W. LOVETT, M.D., F.A.C.S. New York: William Wood & Co., 1923.

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Practical Therapeutics

MYRINGOTOMY IN THE TREATMENT OF ACUTE OTITIS MEDIA*

By M. S. Ittelson, M. D.,

Brooklyn.

There are acute cases of middle ear affection where surgical intervention is clearly indicated. Pus in the middle ear needs an incision in the drum. The accepted surgical principle *ubi pus, ibi evacua* holds good here as it does in other parts of the body. But in a fair proportion of cases presented for examination it is difficult to determine definitely that this condition is present. In these doubtful cases the question frequently arises whether to operate or to treat the patient expectantly. There is a difference of opinion on this point. It may be of some value to know the reasons for the different views.

The dissension in the treatment of acute otitis media is in a large measure due to the difficulty that is frequently encountered in the attempt to determine the nature and the extent of the inflammatory lesion that is present. A satisfactory examination of the ear is not always possible. It is difficult when the patient is restless; when the canal is narrow, or when the view of the drum is obstructed by hair, adherent epithelial shreds or other material the removal of which irritates the parts and alters the picture. Bulging of the drum, unless marked, may be difficult to recognize. Neither is this bulging an accurate indication as to the amount of pressure to which the drum is being subjected. A relaxed and thickened drum may sag or prolapse almost from its own weight. A tense drum, on the other hand, will resist much of this intratympanic pressure and will show little change although an extensive exudate is present. It is frequently difficult to determine whether the suspected fluid is serous, sanguineous or purulent, and it is upon this point that a choice of treatment sometimes depends. Neither can we judge the progress of the infection from the aural examination or whether the inflammatory process is advancing or receding. In either case the autoscopic picture may for a time remain unchanged.

The history and constitutional symptoms, including pain, temperature and general appearance, are exceedingly important, but there are times when the information that we get from this source is also meagre. Children cannot localize or indicate their pain. With an acute otitis media they may point to the abdomen or to another part of the body. Rolling the head and putting the hand to the ear are suggestive but often these symptoms have no significance. The amount of earache complained of depends on the temperament of the patient. A neurotic patient will exaggerate a pain while a phlegmatic individual will underestimate it. An elevation of temperature is generally present in otitis media, but this fever can be caused by many other conditions which may be difficult to exclude. The cases therefore are numerous, particularly when the otitis media occurs secondary to some other disease, where an early accurate diagnosis cannot readily be made.

In the treatment of these cases we have the uncertainty in the diagnosis on the one hand; on the other, the fear of complications which may result from a delay in incising the drum. It has been repeatedly emphasized that prompt surgical measures are the most effective ones that can be employed and that an early incision in the drum is an essential requisite for the prevention of the further spread of the inflammatory process. By this means an exit for any possible exudate is provided, and the patient is given the best chance to escape needless pain, chronic suppuration, mastoiditis, and other more serious consequences. It has also been emphasized that to wait for a spontaneous perforation is inexcusable, that the opening made by Nature is seldom sufficient to give adequate drainage, and that such perforation usually occurs too late to prevent serious complications. An incision properly performed is without risk and, if the inflammatory process is not severe, the drum membrane has a tendency to heal rapidly. With an early incision therefore there is much to gain and little to lose.

This is the rule which is generally recommended in the textbooks and one which is widely followed, yet there is a strong suspicion that this conclusion is not entirely correct. It may be of historical interest to know that paracentesis in the treatment of acute otitis media is a comparatively recent operation. Introduced by Schwartze in 1870, it was not until several years later that this procedure became of general use. Many careful observers, and among these must be included Zaufal and his followers, express grave doubt that the retention of a purulent exudate in the middle ear cavity is a causative factor in the production of mastoiditis. The occurrence of this, as well as other complications, in their opinion, is essentially due to the nature of the infection, the anatomical character of the temporal bone, and the resistance of the individual. They also believe that acute otitis media, particularly in children, frequently runs a definite, cyclic course, not unlike pneumonia. Beginning with a sudden onset, sometimes with a chill, the temperature and pain continue for seven or eight days, when a sudden change takes place and recovery frequently follows. They are therefore in favor of postponing surgical interference until such time and to employ it only in those cases where resolution does not take place.

There is evidence to support this latter opinion. Mastoiditis does follow an early and adequate incision of the drum. Evidence is lacking that after a late incision complications are relatively more frequent, or that they occur because of this delay. The course of the disease, where for some reason or other an operation is postponed, and where spontaneous perforation takes place, is frequently so favorable that there is little reason for regarding such an occurrence with apprehension. The relief of pain following myringotomy is limited to the cases where the pain is due to the pressure of fluid on the drum. Frequently in the early stages of this disease, an exudate is absent and the drum membrane is retracted. Under these circumstances the pain that is due to causes other than to this pressure unfortunately persists in spite of an incision. An objection to an early myringotomy is that it is more likely to be unnecessary; and this objection cannot be entirely disregarded. Obviously a discharging ear is avoided when the drum membrane is intact. It has been demonstrated that bacteria from the nasopharynx gain access to the middle ear more rapidly when an opening in the drum is present. Even by observing all aseptic precautions, a sterile cavity may be contaminated, or a different organism may be introduced and a mixed infection may follow. In a child already debilitated by disease, it may be particularly desirable to avoid or at least to postpone all surgical procedures except those urgently required.

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*Read before the New Utrecht Medical Society, Brooklyn, N. Y., October 19, 1922.

It may be of interest, therefore, to know that recently a few physicians, both pediatriasts and otologists have accepted, perhaps independently, Zaufal's recommendation and have delayed myringotomy for several days in the treatment of acute otitis media. In the beginning of the disease, and this applies to the cases where the classical symptoms such as pain, temperature and a bulging drum are present, the patient after receiving a laxative is put to bed. A weak epinephrine solution is instilled into the nostrils to reduce the nasopharyngeal congestion. The customary glycerin ear drops are prescribed, and the ear is frequently irrigated with a hot solution. If after waiting four days the local and constitutional symptoms do not improve, an incision is then performed. The milder cases can thus be more easily eliminated. In the more severe cases it is asserted that there is an advantage if before incising the drum the inflammatory process is allowed to become somewhat localized and walled off, and the patient is given a chance to develop some immunity to the invading organism. The physicians who have followed this method report that the number of cases requiring myringotomy have been considerably lessened and in those cases where it had to be done mastoiditis as well as other complications have been relatively rare.

It is not my intention to accept as final the findings of one group of men as opposed to another group. It is important, however, that the different views should be more generally known. While the advantages of an early incision have been repeatedly emphasized, the contrary opinion until recently has been largely ignored. It is doubtful whether a physician has been given an accurate picture as to the probable outcome of the disease after conservative treatment. Possibly it is for this reason that in the recent influenza epidemic there has been according to Dench "a lack of discrimination in opening the membrane."

Myringotomy, like any other valuable operation, has its limitations. The danger of a delay can be unduly emphasized. Acute otitis media is a comparatively frequent condition. In any general disease affecting the upper air tract, an otitis is not unusual. A large number of these patients do get well whether the drum is incised or not. It would be highly desirable if surgical interference could be limited to those cases that really need it. The readiness with which this object can be attained is in direct proportion to the extent that these different views are clearly and dispassionately kept in mind.

458 Fiftieth Street.

Letters to the Editor.

SOAP THE EXCITING FACTOR IN DIFFUSE OTITIS EXTERNA (ECZEMA)

Philadelphia, *March* 20, 1923.

To the Editor:

For some years I have been impressed with the feeling that otologists frequently overlook the importance of soap as the exciting factor in many cases of eczema of the external auditory canal with the accompanying intolerable itching. That various types of external irritants are responsible for this troublesome condition is mentioned in the textbooks—even water is not overlooked; but the rôle of soap has not been mentioned in this particular type of the condition.

All patients who have been instructed to occlude the auditory canal with a well greased plug of cotton before washing the face and neck have reported relief from the itching or cure of a condition which formerly had resisted the usual treatment at the hands of other physicians. It is not intended to convey the idea that all other local or general treatment is thus rendered useless, but this procedure aids in hastening or effecting a cure.

Harry A. Schatz, M. D.

2035 Chestnut Street.

CANCER IN ANIMALS

San Francisco, Calif., *March* 27, 1923.

To the Editor:

An editorial entitled Cancer in Domestic Animals, published in the March 21st issue of the New York Medical Journal, reminds me of personal observations along that line.

Cancer of the clitoris, beginning as a small epithelioma, is common in the mare. Rarely it becomes carcinomatous and slowly progressive, involving the whole pelvic region. Veterinarians can remove quite a large growth involving the external genitals and healing will be so perfect that the mare may be disposed of in the market with but little question of her soundness, before the deeper metastatic processes manifest recurrence. I personally know of one such case. Two other mares in the same stable had epithelioma of the clitoris which remained dormant and never caused trouble.

Melanotic sarcoma is common in the mare and infrequent in the male horse. It occurs primarily as multitudes of smooth peasized nodules on the under surface of the stub of the tail from whence it spreads to the perineal tract in the form of granular excrescences and may remain so for years. Rarely it extends to the whole after half of the animal, appearing externally and internally.

Some years ago I removed a mass as large as a baseball from a mare's hip and had the mass sectioned in a laboratory. This mare had thousands of nodules over the whole after half of her anatomy.

My attention was called to this disease by Dr. W. E. Wadams, a veterinary surgeon of Santa Clara, Cal.

Ethan H. Smith.

528 Flood Building.

Abstracts from Current Literature

SURGERY.

Surgical Treatment of Chronic Ulcer of the Body of the Stomach.—William Billington (*British Medical Journal,* July 8, 1922) asserts that he has seen poor results following surgical procedures in gastric ulcers, regardless of the technic employed. The chief determining factor for success is the situation of the ulcer: the further the ulcer is from the pylorus, the more difficult the relief of symptoms and the less satisfactory the results, regardless of the pathology of the ulcer. Röntgenography shows that an ulcer of the stomach produces a spasm of the segment in which the ulcer is located, a considerable delay in the passage of the gastric contents past the ulcer and feebleness or absence of peristalsis in the rest of the stomach. Success in relieving the symptoms depends upon the relationship between the site of the ulcer and that of the new stoma: the latter should be placed well on the proximal side of the ulcer and the ulcer and the stoma should have a definite relationship to each other. To secure proper drainage of the stomach and to avoid the formation of the distal pouch, a second anastomosis between the distal pouch and the jejunum should be made, or the pouch should be exterminated.

Chronic ulcer of the body of the stomach should be treated as though an hourglass constriction existed at the site of the ulcer, either with a partial gastrectomy, the distal pouch together with the ulcer being removed and the proximal pouch anastomosed to the jejunum, or with a double gastroenterostomy, with openings between the stomach and jejunum on either side of the ulcer. The choice between these two procedures is determined by the conditions found at operation and the clinical evidence of malignancy. The latter procedure is preferable, either with a single long opening or with two separate anastomoses. The results are excellent. The question of malignancy must also be considered and this is determined by the duration and persistence of the symptoms. A short history with persistent and increasingly severe symptoms is highly suggestive and calls for gastrectomy, if possible. The ulcer should be excised or destroyed by the actual cautery, provided the stomach on either side is drained, but this is unnecessary in the simple cases and impracticable in the worst cases. The operation which is the least severe and gives just as good results as the severe operation should be selected.

Treatment of Dislocation of the Foot.—B. H. Moore (*Surgery, Gynecology, and Obstetrics,* December, 1922) states that primary reduction is most desirable and gives excellent results. The method of reduction depends on the variety of the dislocation, and utilizes the underlying principle of the reversal of the force causing the dislocation. Irreducibility is not infrequently a complication mentioned in the case reports in the literature. The causes given are: 1. Interposition of a portion of the annular ligament between the scaphoid and the head of the astragalus. 2. Engagement of the neck of the astragalus by the tendon of the anterior tibialis muscle or in extreme cases by the tendon of the posterior tibialis. Quénu lays stress on the first cause, while Baumgartner and Huguier emphasize the second. Either condition would call for open reduction.

For old dislocations, astragalectomy is the method of choice. Quénu advocates it for all over nine days old. This seems rather radical as the first case reported was not reduced until two weeks after the injury, and yet no great difficulty was encountered and the result was good. One case is reported in the literature in which closed reduction was accomplished six months after the injury. This was in the preantiseptic period and at the present time probably would have been operated on. Baumgartner and Huguier collected the results of twenty-three astragalectomies for old, irreducible, and compound subastragaloid dislocations. Of these, thirteen gave good function, six resulted in ankylosis, one required secondary amputation, and two resulted in death from sepsis. These cases included those operated on in the preantiseptic period. Since their report, Thienhaus and Quénu have each reported an old case treated by astragalectomy, with excellent results.

Subastragaloid dislocation of the foot is a rare injury, alternative with abduction and adduction fractures in the region of the ankle. The physical signs of subastragaloid dislocation outward are eversion and abduction of the foot, with prominence of the head of the astragalus on the inner side of the foot. In old cases there is lowering of the malleoli and thickening of the foot below the malleoli. Treatment in recent cases is reduction, either open or closed as may be indicated. Total astragalectomy gives good results in old cases.

A Method of Reducing Congenital Dislocation of the Hip.—F. W. Goyder (*British Medical Journal,* September 16, 1922) proposes the following method for the reduction of the left congenital dislocation of the hip: The patient's sacrum is placed on a sandbag and the right side of the pelvis is steadied by an assistant. The knee and hip are flexed, the latter as much as possible till the knee lies as close as possible beside the trunk. With the surgeon's right hand upon the patient's left knee, the aim should be: 1, to push the head of the femur toward the acetabulum by downward pressure, and, 2, to direct the movements of the femoral head by rotation at the knee. The palm of the surgeon's left hand is placed against the great trochanter with the thumb in front and the fingers on the neck of the femur behind. While downward pressure is maintained with the right hand to keep the femoral head as low as possible, an attempt is made, by lifting with the finger of the left hand and depressing the right hand with or without rotation, to put the head below the acetabulum. The forward position of the head is maintained while gradually relaxing the pressure on the knee, when the head sinks noiselessly into the acetabulum. External rotation at the hipjoint brings the limb into the Lorenz position. The thigh should finally be approximated at right angles to the body and the knee should be more dorsally flexed than the pubic symphysis, so that the head of the femur is fairly prominent in the groin.

Forward Dislocations of Both Bones of Forearm at the Elbow.—I. Cohn (*Surgery, Gynecology, and Obstetrics,* December, 1922) states that anterior dislocations of both bones of the forearm are rare. In all cases which have been verified by operation or autopsy, there has been an extensive laceration of the ligaments about the joint and a stripping up of the muscles in the immediate vicinity from the respective bones. Anterior dislocations of the elbow may be either uncomplicated, or associated with a fracture of the olecranon or coronoid process. A review of the literature suggests that some of the cases have been reduced with very little difficulty. In the case which formed the basis of the author's report there was an extensive stripping up of muscles and interposition of soft parts between the lower end of the humerus and the ulna. Such a condition indicated the impossibility of a nonoperative reduction, particularly if seen late. The approach to the elbow in such instances had best be done by lateral incisions rather than the linear posterior incision, or the method recently suggested by MacAusland. The position after operation had best be one of complete extension, because the olecranon in complete extension is fixed in the olecranon fossa behind the trochlea. If the elbow is put in hyperflexion there is a tendency of the olecranon to slip forward again and reproduce deformity. After a few days it is advisable to begin mobilization of the joint.

Fracture Dislocations of the Humeral Head.—Weller Van Hook (*Boston Medical and Surgical Journal,* December 28, 1922) makes the following points: 1. Where wounds of the bony surfaces of any joint or of its capsule have occurred, and especially where loss of substance has taken place, fatty tissue (usually subcutaneous areolar tissue) should be implanted to cover the defect, whether or not the injured tissue lies between articulating surfaces.

2. Since transplanted fat tissue must become vascularized before it can be permanently stable in its new histological and functional relations, pedicled flaps are better than free flaps which must acquire entirely new blood and lymph vascular associations.

3. The removal of fragments of the humeral head, after simple fracture, gives excellent results under aseptic healing. But muscular attachments must be reestablished, capsular rents and bone surfaces deprived of endothelium should be covered with transplanted fascia and fat, dressing should be maintained in full abduction, and massage and passive motion must be instituted and kept up until the maximum of function is restored.

Reconstructive Surgery.—G. R. Girdlestone (*Practitioner,* December, 1922) says that the qualities most needed in this work are: 1, A capacity for thorough and careful examination of the case and its history with special inquiry into the actual disability of function and how far that interferes with the patient's wage earning capacity and vitality; 2, the power of recognizing what are the essential points of the disability, though perhaps they are not the most obvious ones; 3, an ability to assess at their real value the probable end results of the various methods of treatment, as judged by the patient's ultimate health, activity, freedom from pain, and fitness for work.

Cholecystectomy. — A. J. Brown (*Surgery, Gynecology, and Obstetrics,* October, 1922) asserts that the functions of stomach, duodenum, and pancreas are very closely connected by the sympathetic nervous system. A break in this system made by an operation will cause a lack of coordination in the interaction of these various viscera which will give rise to disturbed digestion with resulting symptoms. This disturbance can be avoided by carefully performed intraperitoneal dissection of the biliary system with as little trauma and destruction of tissue as possible. In order that after operation the bile may have a free passage from the liver to the intestine, it is important that the normal relation between the stump of the cystic duct and the hepatic ducts be maintained. This can be done by anchoring the stump of the cystic duct in the incision made in the anterior leaf of the gastrohepatic omentum. Postoperative adhesions can be minimized by forming cuffs of the peritoneum covering the gallbladder and after removal of the gallbladder, suturing the cut edges of these cuffs.

Experimental Cholecystenterostomy.—Gatewood and Poppens (*Surgery, Gynecology, and Obstetrics,* October, 1922) state that from experiments performed upon dogs in which the gallbladder was anastomosed to the stomach, duodenum, and colon, the following conclusions may be drawn: 1. The gallbladder invariably becomes infected regardless of the viscus used for anastomosis. 2. There is little, if any, difference between the stomach and duodenum in the matter of rapidity of infection. 3. The colon is not the portion of the gastrointestinal tract to be chosen by preference. The immediate dangers of peritonitis are much greater, and probably liver infections would occur earlier than when the upper part of the gut is used. 4. All livers become infected sooner or later if the method employed in our experiments be followed. 5. Cholecystenterostomy, from an experimental viewpoint, is not an operation to be recommended for use except in well selected cases, such as carcinoma of the pancreas where the temporary comfort of the patient is paramount, or irreparable common duct obstruction.

Pin Traction in Fractures of Forearm.——William H. Bailey (*Southern Medical Journal,* May, 1922) comes to the following conclusions: The glucose tolerance test has been shown to be of considerable assistance in establishing the diagnosis of cancer, especially of gastrointestinal carcinoma when the other conditions that give a similar blood sugar curve have been eliminated. Ether should not be the anesthetic of choice when the patient is found to show an acidosis by a low carbon dioxide combining power of his blood plasma, or some other of the accepted methods. In gastrointestinal cases showing a starvation acidosis a two stage operation may well be considered. A poorly functioning organ is to be feared more as a factor bearing on the operative risk of the patient than a diseased organ that is doing its work satisfactorily. Many deficient metabolic processes of the body may ultimately affect the functional ability of the kidneys. No one test for kidney function should be used to the exclusion of all others. Blood tests, like all other laboratory procedures, must be considered only as additional clinical evidence and their value determined by weighing them with all the data available. A phenolsulphonephthalein output of over seventy-five per cent. in two hours may be a sign of lessened kidney function. A low phenolsulphonephthalein result is not always an indication of a serious kidney impairment, especially when the blood retention products are not found to be excessively high. A high blood urea content is probably always an indication of lessened kidney function regardless of the results of the other tests. Satisfactory results cannot be expected from these tests if their performance be left to some one not thoroughly conversant with the chemical procedures involved. The estimation of blood creatinin is the most valuable prognostic sign we have in cases of renal deficiency.

The slight delay caused by these preoperative studies of the patient would not be a detrimental factor in lessening the patient's chances for recovery in the majority of operative cases. Blood chemistry is of special value in cases of hypertrophied prostate and other mechanical chronic obstruction to the outflow of urine. We should strive to attain that ideal, when every operative patient will be carefully studied by clinical and laboratory methods to accurately ascertain his "surgical risk" before operation, as then that epoch of physiological surgery will become an established fact.

GENITOURINARY DISEASES.

Erythrocyte Sedimentation Test in Urology.—Walter Pewny (*Wiener klinische Wochenschrift*, July 27, 1922) tested the rapidity of the sedimentation of erythrocytes in a large series of urological cases. As a rule, the test is positive in urethritis only in the presence of a simultaneous marked prostatitis, cystitis, or epididymitis. He believes it to be of value in the differential diagnosis in the following conditions: adenoma and carcinoma of the prostate, renal stone and renal tumor, etc. In this test, only the normal rapidity of the sedimentation should be considered. This test is also positive in infiltrative tuberculosis, neoplasms and in florid pyelitis in tuberculosis of the kidney and the bladder it runs parallel with the severity of the process, for which it may serve as a measure. During the course of the treatment it is believed to be an index of the success of the therapy.

Retention of Urine in Elderly Men.—J. Swift Joly (*Lancet*, July 22, 1922) says that the senile enlargement of the prostate is the most common causes of retention of the urine in men over sixty years old. The presence of residual urine is the first evidence of retention and the symptoms vary according to the amount of the residual urine. With a small amount, the symptoms are increased frequency of micturition, a diminution of the urinary stream and a diminished force and a delay in commencing the act of urination. With a large amount of residual urine, the symptoms are marked frequency, especially at night, a dribbling stream, without force and a marked delay in the starting, associated with straining; there is also polyuria and a diminution in the urinary solids and urea. The back pressure on the kidneys produces renal failure. The next stage is complete and chronic retention with overflow incontinence, renal failure and uremia.

In acute retention, if the bladder rises no more than two inches above the pubis, the bladder may be completely emptied by catheterization, hexamethylenamin is administered and the catheterization may be repeated in six to eight hours; bed rest is essential until spontaneous micturition occurs. If the bladder is overdistended, only fifteen ounces of urine should be drawn off at first; subsequently the bladder may be emptied either by catheterization every six or eight hours, gradually increasing the amount drawn off until the bladder is completely emptied, or a retention catheter, armed with a spigot, is introduced and four to five ounces are drawn off every hour. When once the bladder is emptied, it should not be allowed to refill. Patients with chronic retention and overflow incontinence, must be put to bed before any instrumentation is begun. A catheter is then passed into the bladder and the amount drawn off is determined by the average amount of urine which collects during one hour; this amount is drawn off through a spigot so as to avoid hematuria and suppression of urine. Catheter life should not be encouraged.

A New Method of Testing Kidney Function (Thiosulphate Test).—In view of the fact that none of the various tests for kidney function used heretofore have been found to be entirely satisfactory, W. Nyiri (*Wiener klinische Wochenschrift*, June 29, 1922) advances a new test with sodium thiosulphate. When this chemical is injected intravenously, sixty to seventy per cent. of it is normally oxidized into sodium sulphate, the rest (thirty to forty per cent.) appearing in the urine as sodium thiosulphate. With a disturbed renal function, only small amounts of thiosulphate appear in the urine, amounting to one to twenty-three per cent., according to the severity of the lesion. The greatest part of the excretion both in normal and diseased kidneys takes place during the first hour after the intravenous injection, there being little excretion in the second hour and in the third hour only traces, if any at all are demonstrable in the urine. The quantitative estimation of the thiosulphate in the urine is made with iodometry; the substances in the urine that normally bind iodine must be previously removed with animal charcoal.

The test is made is follows: After the patient has completely emptied his bladder, ten c. c. of a sterile ten per cent. solution of pure sodium thiosulphate in distilled water is injected intravenously. The patient then empties his bladder at three successive hourly intervals. After determining the quantity passed in each specimen, about twenty c. c. of each specimen are mixed with about 0.5 gm. of well cleaned animal charcoal and filtered for three minutes. About ten c. c. of each clear filtrate are then mixed with some starch solution and titrated with an accurately made one tenth normal iodine solution until the blue coloration appears. The urine passed previous to the intravenous injection is treated similarly as a control; according to its concentration, it requires one to two drops of iodine solution (0.05 and 0.01 c. c.). In the calculation of the amount of iodine solution used, 0.1 c. c. is deducted in every portion of urine. The calculation is made as follows: One c. c. of tenth normal iodine solution is equivalent to 15.8 mg. sodium thiosulphate and therefore 15.8 multiplied by the number of cubic centimetres of iodine solution used (less the 0.1 c. c. mentioned) gives the amount of thiosulphate contained in ten c. c. of urine. By estimating this for the whole one hour specimen, the quantity of thiosulphate is figured.

It is very important that only the best chemically pure animal charcoal be used and this be washed for several days previous to its use and then dried in the water bath in order to secure reliable results. This test was tried out on sixty patients (120 examinations) in both normal and pathological cases and was found trustworthy. Some of the kidneys showed normal values of 25.3 to forty per cent. of function in contrast to 0.20 to 0.85 per cent. in kidney disease. The advantages of this test are: a painless and harmless injection, urination three times at hourly intervals, the test taking only five to ten minutes to carry out, and the simplicity of the technic.

The Diagnostic Significance of the Wildbolz Own Urine Reaction.—After trying the Wildbolz own urine test in four hundred cases, Ernst Stiefel (*Schweizerische medizinische Wochenschrift,* July 27, 1922) comes to the conclusion that the negative result most likely excludes the existence of an active tuberculosis, if the test is carried out with the original technic and provided the Mantaux tuberculin reaction with 1:10,000 solution is positive. A positive result, however, does not absolutely indicate the presence of an active tuberculosis: forty-one out of 143 cases (twenty-eight per cent.) showed a positive result without any clinical symptoms of active tuberculosis. It can well be imagined that the antigen may possibly be produced in purer solution through an improvement of the technic, so that false reactions may be prevented from occurring.

Interstitial Cells of the Testicle.—Carl Sternberg (*Wiener klinische Wochenschrift,* July 20, 1922) states that many of the more recent investigations (excluding the transplantation experiments) show that an endocrine effect on the external sexual characters through the interstitial cells has not been definitely proved and that, as a matter of fact, most of the findings militate against this assumption. He denies the existence of the puberty gland, and in so far as Steinach's rejuvenation procedure is based upon this assumption, it rests upon false premises. Nothing is said as to the practical value of this operation as that is left to those with experience in this particular field. It has been positively shown that the interstitial cells appear very early in the embryonal development, and most likely they represent variations of connective tissue cells. In certain stages of fetal life they are found in great numbers, to decrease in amount later; an increase of the same occurs about the time of puberty. Under pathological conditions, an increase of the interstitial cells is often found in atrophy of the testicle from the most varying causes, but by no means always. All of these findings support the theory of the interstitial cells being accessory organs of the generative parenhcyma of the testicle, even though many of the findings formerly established can be made to conform with this assumption only with much difficulty. Some of the findings suggest a resorptive or resorptive secretory activity, and frequently it appears as if the interstitial cells were merely a compensatory substitute proliferation for destroyed parenchyma of the testicle.

Rupture of Bladder.—T. T. Thomas (*Annals of Surgery,* July, 1922) says that intraperitoneal rupture of the urinary bladder is infrequent and its literature scanty. Its mortality is still high but has been much improved in the past forty years, before which recovery was almost unknown. The absence in the posterior or peritoneal wall of the normal bladder of a sufficient laxity for easy and secure suturing of a rent in it is entitled to more consideration than it has received. Free escape of urine into the peritoneal cavity through an intraperitoneal rupture, closed poorly by suture or not at all, will not necessarily lead to a fatal peritonitis. Free suprapubic drainage with the Murphy enteroclysis and the Fowler position may lead to recovery.

Tumors of Urethra.—School and Braasch (*Annals of Surgery,* August, 1922) summarizes as follows: Malignant tumors of the male urethra often develop following long standing urethral infections. Primary tumors are extremely rare both in the male and female. In the female they are generally located in the anterior urethra and tend to grow outward, away from the bladder. Most malignant tumors of the urethra are squamous cell growths. They are highly malignant but are well walled off by fibrous tissue and lymphocytic infiltrations. They tend to remain limited to the local condition and to the regional lymph glands and usually respond readily to radium treatment. Three cases of epithelioma of the female urethra and one of the male urethra are reported from the Mayo Clinic. Benign solid tumors are only rarely seen in the urethra. The majority of these belong to the group of fibromyomas.

Treatment of Bladder Cancer.—W. E. Lower (*Annals of Surgery,* September, 1922), speaking of end results in operations for bladder cancer, summarizes as follows: 1. A large percentage of the malignant cases are of papillary origin, which means that they were referred late to the surgeon. 2. The percentage of recurrence is great whatever the method of operation, whether excision or cauterization. 3. Recurrence is no contraindication for treatment, as some of the best results have resulted from operation on cases with recurrences. 4. Repeated observation after operation is absolutely essential if the mortality of carcinoma of the bladder is to be reduced. 5. The good results of the treatment of recurrences are due to the fact that recurrences are nearly always local and very seldom metastasize.

Effect of Radioactive Baths on the Wassermann Reaction.—Mittenzwey (*Wiener klinische Wochenschrift,* July 27, 1922) reports on the favorable influence of radioactive baths on the Wassermann reaction and on the clinical symptoms, namely, in tertiary syphilitic processes. In six cases the Wassermann reaction showed a distinct improvement. The clinical improvement is the result of a marked perfusion of the infiltrated tertiary lesions with blood, thereby favoring the action of antisyphilitic drugs. The old disease depots must first be loosened up by overheating to make them accessible to the blood and lymph circulations and to render mobilization possible. This may explain the cases that show clinical improvement after the administration of nonspecific remedies without any corresponding serological improvement.

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DISEASES OF THE EYE AND EAR.

Significance of Retinal Hemorrhages.—C. O. Hawthorne (*British Medical Journal,* September 16, 1922) draws the following conclusions: 1. Retinal hemorrhages may exist without recognized prejudice to vision and ophthalmoscopic examination is therefore a necessary part of every clinical examination. 2. Such hemorrhages may be the first objective signs of serious disease. 3. The recognition of retinal hemorrhage is of great value in directing the observer to a correct interpretation of the clinical facts, while the prognostic significance of the observation *per se* is indeterminate. 4. Retinal hemorrhages occasionally exist as isolated clinical facts and when so existing are comparable to hemorrhages in other parts of the body (hematemesis, hematuria, hemophysis, etc.), for which there is no ready explanation at hand.

Recovery of Vision After Incipient Panophthalmitis Following Cataract Extraction.—H. Kirkpatrick (*British Medical Journal,* July 15, 1922) reports recovery of vision in an eye which was afflicted with early and virulent infection after an operation for senile cataract. The abortion of the panophthalmitis and the recovery of the eye are attributed largely to the thorough use of eye baths of magnesium sulphate. The action of such baths in gonorrheal ophthalmia is especially striking. This solution seems to exercise a powerful osmotic action through the inflamed membrane and its use is always followed by a very marked reduction in the chemosis and by the restoration of a healthy circulation in the conjunctiva. Excellent results are achieved in gonorrheal ophthalmia with this treatment in combination with urotropin and vaccines, provided the corneal ulceration has not yet advanced to the irreparable stage. The lotion should be applied thoroughly by using the eye bath with the patient in the reclining position and he should constantly open and close the eye so as to maintain the circulation of the solution. The application is made for at least five minutes and it should be repeated within two hours in severe cases.

Remote Results of Complete Homotransplantation of the Cornea.—Albert H. Ebeling and Anne Carrel (*Journal of Experimental Medicine,* November, 1921) performed the operation described on cats to develop a better technic for homoplastic transplantation. The technic consisted essentially in using a large rectangular flap, fitted like the door of a safe into the edges of the corneal opening, and in fixing it securely in its position by stitches. The following steps are described: The preparation of the eye, the preparation of the graft, resection of the cornea and transplantation; fixation of the graft, and postoperative treatment. A flap composed of the entire thickness of the cornea of a cat was transplanted to the cornea of another cat, and was found to be perfectly transparent two years after the operation. The curvatures of the cornea appeared to be normal.

Cataract Extraction with Iridotomy.—R. P. Ratnakar (*Indian Medical Gazette,* Setpember, 1922) describes two operations, one with peripheral iridotomy, the other with complete iridotomy. In the former operation he picks up the iris near the periphery with a pair of curved iris forceps, makes a vertical or radial slit in it two or three mm. long, then uses the cystotome and expresses the lens asin simple extraction. In the latter operation he picks up the iris at its pupillary margin, draws it out of the wound, and then with a pair of straight sharp scissors inserted into the pupil, one blade behind, the other in front of the upper margin of the pupil, makes a snip not up to the periphery. The advantages he claims for this method over extraction with iridectomy are: 1, little or no pain; no bleeding as the vessels are not cut across; smaller, neater and more regular coloboma. Just how a prolapse of the cut iris, which has once been drawn out of the wound, is to be avoided he does not state.

Therapeutic Use of Uveal Pigment in Sympathetic Ophthalmia.—Alan C. Woods and Arnold Knapp (*Archives of Ophthalmology,* November, 1922) report the case of a boy, eight years old, in which sympathetic ophthalmia followed an operation for a perforated corneal ulcer with prolapse of iris that occurred after gonorrheal ophthalmia. The inflammation pursued a steadily progressive course with all the symptoms of the severe type of sympathetic disease. All usual forms of treatment, diet, intestinal irrigations, pilocarpine sweats, mercurial inunctions, large doses of sodium salicylate, and nonspecific protein therapy, were without effect. The serum reaction to an antigen of uveal pigment was negative. The intradermal reaction to uveal pigment was strikingly positive, showing a marked hypersensitivity to pigment. The treatment with uveal pigment consisted of desensitization followed by active immunization, after which the serum reaction against uveal pigment became strongly positive. Synchronous with this, with one short period of acute exacerbation, the inflammation in the eye subsided, the eye became white and has so remained. The active process lasted for three months and has now been stationary three months. Vision is 6/60. The eye is free from inflammation, but shows peripheric retraction, adhesion of the iris, and capsular opacities. Tension is normal.

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Mitral Stenosis*

By SIR JAMES BARR, C.B.E., D.L., M.D., LL.D., F.R.C.P., F.R.S.E.,
London,
Knight of Grace of the Order of the Hospital of St. John of Jerusalem in England.

Mitral stenosis has, perhaps, led to a greater amount of controversy than any other form of heart disease, and therefore affords scope for a much longer address than would be possible or advisable at present. I shall therefore content myself with some of the more debatable points in the clinical manifestations of the disease.

MURMUR IN MITRAL STENOSIS.

The characteristic murmur, when present, is so definite and distinct as to arrest attention at once and leave no doubt as to the nature of the lesion with which we have to deal. Even here opinions have diverged widely as to the phase in the cardiac cycle occupied by the murmur; some associating it with the auricular and others with the ventricular systole, while other murmurs are so long as to occupy the greater part of the ventricular diastole.

The significance of this murmur was first recognized by Fauvel and by him designated presystolic, but it was the late Sir William Gairdner who clearly depicted the clinical signs and the pathological importance of this disease, so that when the murmur, which he termed auricular systolic, or briefly the A. S. murmur, is present, the disease becomes one of the most easily recognized affections of the heart. On the firm foundation which Sir William Gairdner securely laid, a huge superstructure has been raised, much of which is of very doubtful value, and those who wish to get down to the bedrock of facts have much rubbish to clear away. It should be clearly understood that the disease can be readily diagnosed apart from any murmur, but the mere assertion that a patient has got mitral stenosis is of no value unless your diagnosis takes into account the nature and extent of the lesion and its effects. Often when the diagnosis of mitral stenosis has been made the lesion has passed into a more or less irremediable stage, so that our treatment can only be of a palliative character. More attention should be paid to the evolution of disease and its prevention than is common at the present day.

ETIOLOGY AND PATHOLOGY.

Of all the causes or exciting conditions of endocarditis and pericarditis, rheumatism holds the first place; the fibrous tissue seems to be specially vulnerable to the rheumatic poison, but the myocardium may be involved as well as the whole endocardium and pericardium in the inflammatory process. The valvular lesion is determined by the violent collision of the vulnerable valves, and this view of causation has a most important bearing on prevention and treatment, as, by relieving the labored action of the heart in the early stages of endocarditis, the mischief can be prevented or mitigated.

When the rheumatic poison, whether it be animate or inanimate, sets up endocarditis, the myocardium is, in the majority of instances, more or less involved. The systole of the ventricle is slow and labored to overcome the high intracardiac pressure which is set up by increased peripheral resistance. As compared with the temperature the pulse in these cases is not very frequent and may not exceed 90 even with a temperature of 103° F. The pulse is slow, full, and moderately strong, and the tension is well maintained. The blood pressure is much higher than it is in typhoid fever, pneumonia, or diphtheria. Among the earliest signs of endocarditis is a dull first sound and a delayed radial pulse, so that the former can be heard an appreciable interval before the latter is felt. By careful attention to these signs, endocarditis can usually be diagnosed some days before any murmur is heard. The much more frequent occurrence of valvular disease in the left heart than in the right is due to the much greater strain and more violent collision to which the valves are subjected. When the mitral valve is involved we get a beaded row of vegetations on the auricular surface of the valve about one quarter inch or three eighth inch from the margin where the cusps come into most violent apposition, and when the aortic valve is affected the damage occurs on the ventricular surface at the angle of the cusps, which are brought into forcible collision during their closure.

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The vegetations arise from proliferation of the cellular elements in the subendothelial layer of the endocardium. These groups of cells burst through the endothelium, and fibrin is deposited on the rough surface. This has a most important bearing on treatment, for by keeping the blood pressure extremely low in rheumatic fever, endocarditis can often be prevented. Unfortunately the mischief has frequently occurred before we see the patient, and when the valve once has been damaged there is a tendency for the mischief to be maintained and developed, even under the ordinary action of the heart. It is much aggravated by violent collision of the cusps during palpitation, or from high intracardiac pressure from any cause, perhaps from the meddlesome interference of the physician with that much abused drug, digitalis. When free mitral regurgitation takes place, the blood pressure falls, and the pulse increases in frequency.

Children are prone to contract rheumatism, especially those with a hereditary tendency to the disease, but the joint affection may be so slight as to escape notice, and in many cases endocarditis is the only gross expression of the rheumatic affection. Following endocarditis, which may even not have been detected, mitral stenosis is not an infrequent sequence. Many writers have asserted that mitral stenosis is essentially a disease of early life, and some believe the disease to be frequently congenital. While not denying the occasional congenital origin of the lesion, I think it must be extremely rare, as the affection is very seldom detected under five years of age. Moreover, congenital disease usually affects the right side. It is very common in youth, but may occur at any age. Rheumatism is usually associated with, or follows, septic conditions of the throat and nose, and those children are specially liable who have no natural or acquired immunity. Up to the age of puberty the thyroid gland is often rather inactive, hence children are prone to adenoids and enlarged tonsils which prove a ready nidus for infective organism. I have long since pointed out that these conditions could be obviated by a recognition of the cause, giving children, when required, small doses of iodine and thyroid, and allowing a piece of solid iodine to volatilize in their dormitories.

When mitral stenosis has arisen from acute rheumatism the edges of the cusps which are principally affected become gradually united so that the funnel form of the lesion is eventually established. Frequently the cases begin with incompetence, pure and simple, but from fibrous contraction of the auriculoventricular orifice and agglutination of the edges of the valve segments arising from a far too liberal supply of lime, they finally end in stenosis either with or without regurgitation. In such cases you often get the buttonhole orifice.

Mitral stenosis is frequently associated with chorea, and here the mechanical determination of the disease is very apparent. It may arise in cases of protracted anemia associated with high blood pressure and frequent emotional excitement. But it does not arise in cases of exophthalmic goitre in spite of the violent palpitation, because the intracardiac pressure is not high and the lime salts, which are another determining factor, are deficient. It is not uncommon in chronic Bright's disease, and in these cases mechanical strain plays a most important part in its causation. In such cases the orifice is not usually much contracted, but the whole segments of the valve are much thickened, and may be atheromatous or contain calcareous nodules consisting of lime salts or sodium urate. The musculi papillares are much hypertrophied and the chordæ tendineæ thickened. The insertions of the chordæ tendineæ are spread out over the greater part of the cusps, so when there is long continued high intracardiac pressure the whole valve becomes very much thickened, and there is a great increase in the fibrous tissue, which eventually leads to puckering or contraction of the segments and the diaphragmatic or buttonhole variety is produced. Syphilis has also been set down as a cause, but if so, it must in my opinion, be a rare one. Dr. Byrom Bramwell thinks that in some cases large calcareous nodules in the walls of the ventricle—causing obstruction—are syphilitic gummata which have become calcified.

Mitral stenosis is more common in females than in males, for the simple reason that rheumatism and chorea occur more frequently in girls than in boys, and anemia and all emotional disturbances have a special predilection for the female sex. However, men are much more liable to this disease than is generally supposed; and in fact, the disease is much more common among both sexes than is usually recognized. This frequently arises from the fact that it is often overlooked when associated with mitral regurgitation. When associated with tricuspid stenosis I have seen as many cases of the double lesion in men as I have in females. Mitral stenosis is frequently associated with pericardial adhesions, and this arises from the fact that pericarditis is almost as common as endocarditis in children.

The disease is, as a rule, slowly progressive, and although sooner or later it leads to the death of the patient, yet, under proper care and treatment it is slow in its progress, and is quite compatible with a fairly long existence. I have known many cases of mitral stenosis of twenty to thirty years' standing.

In mitral stenosis occurring in early life the orifice usually assumes the funnel form. This arises from the fact that these cases are generally of rheumatic or choreic origin, and the margins of the cusps are primarily affected. The relatively high intracardiac pressure and violent collision of the cusps cause their edges to get cemented gradually together, and taper down into the ventricle as a hollow cone. In the experience of Sansom, Hilton, Fagge, and Hayden, the buttonhole variety almost replaces the funnel form in the adult, but this scarcely accords with my experience. I have found that while the buttonhole variety is scarcely known in children, it is not much more common in the adult than the funnel form. It is true that the orifice at the end of the funnel is often a slit, but that scarcely constitutes a different variety. The characters of the orifice and valve depend, perhaps, more on the age of the lesion than on the age of the patient, and also on the causes which gave rise to the disease.

If there be much fibroid thickening of the whole valve and of the auriculoventricular ring, or if there be much atheromatous degeneration with calcareous deposit, then more or less puckering is produced, and the orifice assumes the buttonhole variety. These conditions occur more readily in adults, and in them the lesion is frequently of long standing. In some cases the mitral cusps are so thickened and contracted that they merely form a transverse septum with a narrow slit between the auricle and ventricle. In such cases the chordæ tendineæ are frequently thickened and matted together, and the musculi papillares are in such a fibroid condition, that it would seem impossible for a first sound to be generated by the mitral valve. This, however, is the exception and not the rule; even in cases in which the orifice is extremely small and its edges much thickened, the valve curtains are usually in a sufficiently vibratory condition for developing sound. The insertions of the chordæ tendineæ are spread over the greater part of the cusps, and the musculi papillares are usually hypertrophied so that tension is vigorously applied to the whole valve. If the musculi papillares be pulled it will often be found that the only part not rendered tense is the thickened fibrous ring. The relatively small quantity of blood in the left ventricle does not muffle the first sound, which is directly conducted to the chest walls through the chordæ tendineæ musculi papillares, and the part of the heart causing the impulse.

The small hypertrophied left ventricle, the thick musculi papillares, and the high intracardiac pressure produce a loud thumping or booming first sound unless the valve be so contracted as to form a septum. The character of the first sound at the apex affords valuable evidence as to the condition of the mitral cusps.

In the evolution of mitral stenosis any excess of calcium ions in the blood plays an important part. The socalled good healing flesh simply means that there is an excess of calcium cement in the blood and tissues. Under certain circumstances this may be beneficial, but whenever there is any tendency to sclerotic changes in the body, nature's attempts at repair are apt to be far in excess of the requirements. In the case of mitral stenosis these excessive calcium ions may be the determining factor in the production of the disease. They raise the blood pressure, increase the force of the cardiac contraction, give rise to hypertrophy of the musculi papillares, cause violent collision of the mitral cusps, increase the formation of the fibroid tissue, and gradually cement and unite the edges of the cusps together. I shall have more to say on this subject when we come to speak of prevention and treatment.

DIAGNOSIS.

When we hear at the mitral area a murmur immediately preceding the first sound, or even a murmur during the long pause, it is a very simple matter to recognize the fact that there is some obstruction to the flow of blood from the auricle to the ventricle, although such an observation cannot be properly called a diagnosis. We want to know the nature of the obstruction, the size of the orifice, and the effects on the circulation. Any observer can recognize a presystolic murmur, but it requires some training to interpret its significance. A great many men base their diagnosis of the lesion on the presence of the characteristic murmur, and as it is absent in a large number of cases, they thus fail to recognize the disease, even in the very extreme and most urgent cases.

In a large number of cases in which the murmur is well pronounced the interference of the physician is uncalled for; but in many cases in which the murmur is absent judicious treatment may be of vital importance. In many cases the only murmur heard is a mitral systolic, due to regurgitation. Now, in my opinion, the treatment of these two affections is in many respects essentially different, and the failure to recognize the underlying condition of mitral stenosis may be fraught with great danger to the patient.

The character of the murmur and of the first sound may help us to estimate the nature of the orifice and the condition of the cusps, but it is only by an examination of the pulse, and by a careful study of the effects of the obstruction, that we can arrive at the far more important calculation of the size of the orifice or the amount of obstruction.

Of all the signs of mitral stenosis, the murmur is the most obtrusive, and, therefore, has perhaps received undue attention, to the neglect of other more constant, and, to my mind, more important signs. The characters and varieties of the murmur have been so well studied and depicted by numerous writers, that very little new can be said on the subject, but, nevertheless, the intensity of the murmur prevents our passing it over in silence in a paper dealing with a lesion in which it plays such a prominent feature. There is, perhaps, no cardiac murmur about which such a conflict of opposing opinions has been waged. Even the very rhythm of the murmur has been disputed, but at last we have arrived at an almost unanimous opinion, that the murmur occurs prior to the systole of the ventricle. Sir William Gairdner happily designated it auricular systolic, which implies a theory as to causation as well as rhythm. There has been the objection to this name that the auricle is often so thin and dilated as to be incapable of any effective contraction, and the objectors substitute the theory of elastic recoil of the auricle, forgetting that under such circumstances there can be no recoil of the auricle, and under no circumstances can the auricle be compared to the aorta or to an overstretched india rubber ball. The atrium may be so thin and dilated as to be incapable of any forcible contraction, but it is very rare for this to happen with the auricular appendix, and the current induced by its contraction may be sufficient to give rise to a murmur. When the muscular contraction of the auricle is so weak as to be incapable of giving rise to a murmur through the narrow or roughened orifice, it is not an imaginary recoil which can do so. Under these conditions there is no murmur, or it occurs at an earlier period owing to the suction action of the ventricle. When you get a rough, rasping, lowpitched murmur immediately preceding the first sound, it must be due to the contraction of the auricle or of the auricular appendix, and is, therefore, auricular systolic. A small hypertrophied auricle gives a powerful and well sustained contraction.

A murmur may arise under any conditions which are capable of giving rise to a *fluide veine*—hence, it is not at all surprising that it does frequently arise before the auricular systole from the blood rushing through a narrow orifice during the active dilatation of the ventricle. The suction power of the ventricles is a matter of ancient history. It was maintained by Brown, Langrish, and afterwards by the illustrious Haller, but it was not until 1878 that the force was expressed in millimetres of mercury pressure by Goltz and Gaule.

The suction power of the ventricle is much aided by the high intrapulmonic blood pressure. Sir William Gairdner recognized and described the murmur as occurring at different periods, and even during the whole period between the second and first sounds.

These different varieties of murmur were named by the late Dr. Bristowe early diastolic, middiastolic, late diastolic, and entire diastolic. The late diastolic corresponds to the presystolic of Fauvel and the auricular systolic of Gairdner. The early diastolic may be purely mitral in origin; but I am convinced that it is often confounded with a short, soft, blowing, diastolic murmur, which not infrequently occurs in this disease at the moment of closure of the pulmonic valve, and which arises from regurgitation through the pulmonic orifice into the right ventricle owing to high pulmonic tension and dilatation of the pulmonary artery. This murmur is usually short, but I have known it to be prolonged well into the long pause and nearly up to the first sound. The occurrence of the early diastolic and middiastolic mitral murmurs depends on high intrapulmonic and auricular blood pressure, a narrow orifice, and the aspirating force of the left ventricle.

The size of the orifice and the nature of the valve segments will largely influence the character of the murmur, as it occurs at any part of the diastolic period.

At an early stage of mitral stenosis, when the further progress of the disease may be largely modified if not arrested, the characteristic murmur is usually absent, or there may be only a mitral systolic murmur. Again, the murmur may be absent in the late stage, when much can be done for the comfort of the patient, and when it is most important to diagnose between mitral stenosis and mitral incompetence. I think, therefore, we should endeavor to recognize the disease independently of any murmur.

ENLARGEMENT OF THE LEFT AURICLE.

One sign to which I attach considerable importance is an extension of the cardiac dullness in the direction of the left auricle. Under normal conditions a line drawn from the centre of the suprasternal notch to the nipple, or a point on the left fourth costal cartilage where the nipple should be, and which for convenience I call the suprasternomammillary line, should mark the outer and upper border of the heart. Any extension of the cardiac dullness beyond this line in the direction of the outer part of the infraclavicular region should raise a strong suspicion of mitral stenosis. This portion of the heart is usually well overlapped by lung, and so it requires very delicate percussion to elicit the extreme margin.

I may here premise that the whole deep cardiac area should be carefully mapped out; we want to know the size and position of the whole heart and of its individual parts. The anterior surface is to a greater or lesser extent overlapped by lung, and so in every case the percussion note of the deep cardiac area is only relatively dull; and in order to get the first shade of dullness, we should, in my opinion, percuss gently from without inwards. When possible I adopt the Albert Abrams method of making the patient stand on a grounded metallic plate facing due West, with the hands and feet well apart, and I have my pleximetric finger encircled with insulating tape. When you wish to bring out the slight dullness or impaired note of the lung in the early or hyperemic stage of pneumonia, then the vibrations of the chest walls should be stopped by the whole left hand laid firmly on the chest, and the middle finger percussed. In this way you avoid the confusion arising from the resonance of the vibrating chest walls, and you obtain the further information of the resistance to the stroke. In the case of the heart, however, it is not a question of resistance or even dullness, but of variation in the percussion note. It is a good exercise to percuss out the cardiac dullness in the cadaver and compare that with the actual area occupied by the heart.

The superficial cardiac dullness gives you some information about the position of the anterior margin of the left lung, but so far as the heart is concerned, it is of no practical value. The cardiac dullness is usually given much too small in standard textbooks; if you compare these pictures with the areas occupied by the heart in the postmortem room, and under the x rays, you will be greatly struck with the difference. Turn the lungs aside and you will find that the anterior surface of a normal heart is as large as many illustrations of extreme hypertrophy. In none of Sansom's plates of cases of mitral stenosis is there any extension of the cardiac dullness beyond what I have termed suprasterno- (or simply sterno-) mammillary line. This, I believe, is not because it was not there, but because it was not marked out. This careful differentiation of the cardiac dullness has yielded valuable results in my hands, and I hope that others will find it worthy of accurate observation. One authority on the heart, who does not believe in the possibility of accurately mapping out the deep cardiac dullness, says that when he sees anyone attempting to do so he inquires if the percussor is trying to map out the heart in systole or in diastole. No doubt this appears very smart to the authority in question, but he should learn that there is very little difference in the size and position of the heart between systole and diastole —when one part of the heart is emptying itself another part is filling, and the whole heart always occupies the same position in the mediastinum between the two lungs. The total size of the heart is much more affected by even quiet respiration than it is by its own systole or diastole. In Muller's or Valsalva's experiment the space occupied by the heart may be reduced by at least a half, but when you are percussing out the heart the respiration is quiet, and therefore it is a heart full of blood which you are mapping out. Not only is it possible to map out the deep cardiac dullness, by percussion, but, where the costal cartilages are fairly pliant, with a little practice you can palpate out their deep area with your eyes shut. The enlargement of the left auricle can be made out both by percussion and palpation, and is one of the commonest phenomena in obstructive mitral stenosis, but in some cases of associated mitral and tricuspid stenosis I have noted its absence. Here the comparatively small amount of blood passing through the narrow tricuspid orifice was carried on without causing great distention of the left auricle.

The pulmonic second sound is accentuated. The intensity of this sound at the pulmonic cartilage largely depends on the amount of lung intervening between the artery and the chest walls. Frequently the sound is heard better over the conus arteriosus or right ventricle. In a certain number of cases there is a short, soft, blowing diastolic murmur (to which I have before alluded) in the pulmonic area, due to slight regurgitation through the pulmonic orifice. This is especially likely to happen when the right ventricle is dilated and hypertrophied, and does not completely empty itself during systole. At the end of ventricular systole, the high tension in the pulmonic artery drives a certain amount of blood back through the closing valves into the unemptied ventricle or the pulmonary artery may be dilated, and the cusps not quite sufficient to close the orifice; in this case the regurgitation is freer and the murmur longer, so that it may occupy nearly the whole diastole. Some think this explanation of the murmur unwarranted, as the valve is usually found competent at the autopsy, but there is a remarkable difference between the pressure of one inch or two inches of water and the pulmonic tension in a case of mitral stenosis.

Doubling of the second sound of the heart is a common phenomenon in mitral stenosis. It is not by any means a pathognomonic sign, as some have supposed it to be, but merely an exaggerated expression of a normal doubling, which can be heard in almost every healthy heart at the end of inspiration or commencement of expiration, and like the normal doubling, the second element of the double sound is invariably pulmonic.

The duplication undoubtedly arises from asynchronous closure of the aortic and pulmonic semilunar valves, and this does not directly arise, as is often assumed, from variations in blood pressure in the aorta and pulmonary artery respectively, but is due to asynchronism at the completion of the left and right ventricular systoles; a relatively large quantity of blood in the ventricle, and heightened blood pressure in its artery, necessarily protract its systole, and so delay the recoil of its artery with closure of its valve.

In normal doubling and in cases of mitral stenosis the right ventricle is overloaded and the resistance in the pulmonic artery is increased, hence the right ventricular systole is protracted, and the closure of the pulmonic valve occurs appreciably after that of the aortic valve. Moreover, the muscle of the right heart more closely resembles involuntary muscular fibre than that of the left, and consequently its contraction is not so brisk, but for the same reason it is more easily stimulated to contract. Doubling of the second sound is an important fact, and its interpretation in any individual case is usually easy, if you will content yourself with the simple intelligible theory which I have enunciated. In many cases of mitral stenosis this phenomenon is absent where it might be expected to be present. This is especially likely to be the case where the right ventricle is failing, free tricuspid regurgitation taking place, or the ventricle not emptying itself during systole. Under such circumstances the right ventricular systole is not protracted beyond that of the left, and so there is no doubling. Its absence, therefore, may be of more grave significance than its presence. We should therefore not view it as a certain sign of mitral stenosis, nor fail to recognize that lesion when that sign is wanting.

The fact that the double second sound is frequently more marked over the right ventricle than at either the pulmonic or aortic cartilages has been urged against the theory of its asynchronous origin. But the site of the greatest intensity of the normal second sound is also variable—in at least fifty per cent. it is also loudest over the right ventricle. If the pulmonary artery is uncovered by lung, even the normal second sound appears accentuated, and the closure of the valve may be felt as a distinct snap, but a good padding of elastic lung tissue interferes very materially with the conduction of the cardiac sounds. The mitral first sound may be well conducted to the parietes through the impulse, even when the point of impact has been entirely formed by the right ventricle; but then the second sound occurring at the beginning of diastole is apt to be absent at this point owing to the impact of the dilated right ventricle not being well sustained against the chest wall. The facts of each individual case should be examined in the light of the conditions present, and not by the theoretical consideration of the examiner. The sound, whether single or double, is best heard at the point of the chest through which it is best conducted by some solid media. Frequently, with one bell of a differential stethoscope at the aortic and the other at the pulmonic cartilage, a double second sound can be heard when only a single sound is heard at either point.

A double first sound is not infrequent, in fact, it is a common event in mitral stenosis. It is not put down as a sign in our textbooks, nevertheless it is a fact. It is difficult to account for this, as it must have been heard hundreds of times by every experienced ausculator. The only explanation which I can offer of this want of recognition of a matter of daily occurrence is the fact that this doubling of the first sound in mitral stenosis is often accompanied by a rolling or tumbling action of the heart which renders the sounds very complex and difficult to analyze. When the heart is working steadily there may be slight dissociation of the tricuspid and mitral first sounds, which is appreciated by the ear, but there may not be complete separation of the two elements.

In these cases the right ventricle invariably initiates the contraction, and the tricuspid element comes first, but before it is completed the mitral element is heard. This *quasi* doubling, or in many cases true doubling, may be followed by a single or a double second sound. Frequently the right ventricle, which is better supplied with blood, gets so far ahead of the left that it starts contraction before the latter is half filled, and so you get a tumultuous or rolling action of the heart. There is a strong pulsation felt over the right ventricle, and this is accompanied by a loud, clear, tricuspid first sound; this wave of contraction is propagated to the left ventricle, and this is accompanied by a short, sharp, mitral first sound. If this occurs soon after the preceding effective left ventricular systole, when there is little blood in the left ventricle, the aortic semilunar valve may not be opened, and in this way you may have twice as many cardiac contractions as pulsations at the wrist. When there is some blood in the left ventricle the semilunar valves may be opened and you get an early abortive systole; you may even have five or six of these small systoles shown in a sphygmogram before the lever reaches the base line. What, then, is the cause of these small pulsations in the down stroke, inasmuch as the action of the heart (or, rather of its right side) may be so powerful as to shake the precordium? It is, in my opinion, undoubtedly due to the overloaded right heart trying to get rid of its extra charge of blood, and so acting in advance of the left. In the sphygmogram a strong, vigorous pulsation, starting from the base line, corresponds to a quiet, even synchronous systole of both ventricles; this may be followed by a tumultuous rolling and apparently forcible action of the heart, but the pulsation at the wrist may be barely perceptible to the fingers, and only recorded in the sphygmogram as an abortive systole, or, as it is nowadays called, an extrasystole. There may be one, two, three, four, five, or six of these extrasystoles before perfect synchronism between the two ventricles is restored, and then you get a full, complete systole, or, as it is frequently called now, a compensatory systole. If the cardiac sounds associated with this tumultuous rolling action of the heart and with each abortive pulsation are carefully analyzed, the following result will be obtained, and, for the sake of clearness of explanation, I shall at first discard the consideration of any murmur which may be present:

There will be heard a clear, short, sharp, but not loud, first sound (which I believe to be tricuspid in origin). This is quickly succeeded by a dull, low-toned, short sound (which I consider of mitral origin). Then, after a short but appreciable interval, there may be a dull, feeble sound (which I ascribe to the aortic valve), and this sound may be absent or coincident with a fourth sound, by which it is quickly followed. This last sound is the loud, accentuated pulmonic second sound.

All these phenomena are often heard over the right ventricle, close to the ventricular septum, or the double second sound may require to be analyzed at the aortic and pulmonic cartilages. In these cases, when there is an auricular systolic murmur, it is usually absent during the extrasystoles, or it may occur as a slight rumbling noise between the two elements of the double first sound. When there is a mitral systolic murmur, it invariably succeeds the second element, and, like the sound, is short and feeble, as it arises from the abortive contraction of a half filled ventricle.

The rolling action of the heart is felt over the right ventricle, but as the two ventricles again assume their synchronous action the impulse is transferred further to the left, and the first sound becomes loud, sharp, and clear, and banging, quite distinct from the short, sharp, clear sound previously associated with the tricuspid valve.

The absence of the auricular systolic murmur with the extrasystoles shows that the wave of contraction is not propagated from auricle to ventricle. In 1886 I advanced the view which I had long previously held that in these cases of abortive systoles the wave of contraction is not propagated from the left auricle, which in many cases is so dilated as scarcely to contract at all, but from the right to the left ventricle. In all obstructive cardiac lesions the effect tells backwards in the course of the circulation; therefore, in mitral stenosis the cavities chiefly affected are the left auricle and right ventricle, which tend to become hypertrophied and dilated. There is also engorgement of the right auricle, all of the viscera, and of the whole venous system. On the other hand, the left ventricle remains a comparatively small cavity, always provided that there is no aortic lesion nor any free mitral regurgitation, and consequently can only throw a small quantity of blood into the aorta at each systole. This small supply to the arterial system does not demand a great holding capacity, and so all the systemic arteries become contracted, and thus the arterial tree is diminished; the arteriolar contraction raises the arterial blood pressure so that the capillary velocity is increased and notwithstanding the venous engorgement you do not get edema.

We have thus high pressure in both circuits, but it is relatively greater in the pulmonic circuit in proportion as the obstruction is comparatively greater and the area smaller. Again we have a comparatively large right ventricle and a small left; the former contains more blood, and therefore tries to discharge more at each systole, but, of course, in a given time no more blood can pass through the right ventricle than that which leaves the left; therefore the extra effort of the right is used up in maintaining high pulmonic tension, which, with the aid of the left auricle, drives the blood forcibly through the narrowed mitral orifice during diastole. The high pulmonic pressure and overloading of the right ventricle often tends to prolong the contraction of the right ventricle beyond the short, sharp, and effective systole of the left, and thus we get asynchronism in the closure of the two arterial valves, with consequent doubling of the second sound. The large distended right ventricle does not completely empty itself during systole, and frequently the discharge is so slight that it is again quickly distended, and then initiates contraction, which is propagated to the left ventricle before it is full. This contraction may get so far ahead of the left ventricle that the systole of the latter may be induced before it contains much more blood than is sufficient to raise the aortic valve. Thus we may get one or more abortive pulsations in the down stroke. This goes on till the right ventricle has disposed of its superfluous charge of blood, and then the rhythm may become quite regular until it is again overdistended. This overdistention of the right side, with initiation of contraction in advance of the left in some cases takes place in a regular rhythm, so that we get the socalled pulsus bigeminus, trigeminus, etc.

On auscultation of the heart this asynchronism at the commencement of ventricular systole may be so slight that the mitral first sound becomes merged in that of the preceding tricuspid sound, and thus we only get a long first sound; or the asynchronism may be so great that we get a regular tumbling action of the heart, and there may be two first sounds with one or two second sounds for a carotid pulsation as I have explained before. This peculiar action is most easily observed when the cycles are infrequent.

The sequence of events may be briefly described as follows: Starting with a forcible contraction of the left ventricle, which is evidenced by a strong apex impulse, loud mitral first sound,, strong pulse, and well marked aortic second sound, this full discharge well fills the contracted arterial tree, keeps the arteries full between the beats, and produces a gradual down stroke in the sphygmogram. The contraction of the right ventricle which accompanies this complete systole of the left may only partially empty its distended cavity; its first and second sounds are synchronous with those of the left side, although less pronounced. The partially emptied right ventricle is quickly recharged, initiates contraction which is propagated to the left ventricle, while the latter is only partially filled. In this case the systole of the right ventricle is more powerful, its impulse stronger, and sounds louder than those of the left.. This may occur only as an occasional irregularity, or, on the other hand, the right systole may keep in advance of the left for several cardiac cycles, and you may have an equal number of beats, or socalled extrasystoles, recorded in the sphygmogram before the lever reaches the base line. What is felt in the pulse as an intermission, or an irregularity in force and rhythm, or is recorded in the sphygmogram as one or more abortive pulsations, is represented on ausculation by an irregular tumbling action of the heart, or a loud thump followed by one or more irregular rolling motions. When the mitral orifice is much contracted, you may have a tricuspid first sound, then a mitral first sound, followed by a single second sound; or this may be resolved into aortic and pulmonic elements, for one carotid pulsation. This peculiar rhythm of the heart, with corresponding irregularity of the pulse, is increased by the lime salts, by digitalis and caffeine, and is lessened by decalcifying agents, by nitroglycerine, and atropine. It is also relieved by such agents as lessen the venous engorgement.

Although this peculiar action is pronounced in mitral stenosis it is by no means limited to that disease. It may arise when the innervation and balance of blood pressure in the two sides of the heart are disturbed from any cause. It is frequently associated with dilatation of the right side of the heart, as occurs in emphysema, with fatty degeneration of the heart, and atheroma of the coronary arteries. It is not uncommon in the infiltrated or degenerated fatty hearts of elderly people affected with an acute blood poison, such as erysipelas, septicemia, or diphtheria. It may occur in gout, either active or latent, but as a rule in these cases there is usually a true intermission; the whole heart comes to a standstill for one cycle. In a case of Stokes-Adams disease, which I published in the *British Medical Journal* in 1906, when the patient took a deep breath and held his chest expanded the frequency of the contractions of the right side of the heart was increased, but after a couple of beats the left ventricle came to a standstill and an epileptic seizure was induced; this continued until the large intrapulmonary vascular cavity was repleted. In many cases the peculiar rhythm arises from the fact that the right side of the heart is usually more susceptible to stimuli than the left.

It is not sufficiently recognized that the heart is not a single organ, but two organs—each of which has got its own definite work to perform—linked together for mutual assistance in cases of stress or difficulty.

All parts of the heart can be excited to contraction by various stimuli, except during the refractory period; but the right auricle is the most sensitive part of the heart, and responds to stimuli for some hours after the rest of the heart has become quiescent in death. The two auricles are intimately linked together by a community of muscular fibre, and, although the wave of contraction may, and I presume usually does, commence in the right auricle, it is quickly propagated to the left, and consequently their contractions are simultaneous. When the auricles have driven a sufficient amount of blood into the ventricles to raise the diastolic pressure and stimulate contraction the ventricular systole begins, and it is rapidly propagated over both ventricles. The right ventricle is usually more sensitive than the left, or is better supplied with blood, for when you get doubling of the first sound the first element is almost invariably associated with the right ventricle. Although the right ventricle usually initiates ventricular contraction, it is often slower in completing its work than the more powerful left ventricle, because when you get doubling of the second sound the final element is frequently pulmonic. In Muller's experiment and in cases of pulsus paradoxus the systole of the left ventricle may be delayed or abolished for one or more beats, owing to defect in the diastolic tension. All parts of the heart act rhythmically; but even in perfect health the rhythm is constantly liable to considerable variations, which are readily detected if you will take the trouble to measure the various periods of activity and rest, not in fifths of a second, but in fiftieths or hundredths.

The length of ventricular systole depends on the amount of blood to be driven, the power of the ventricle to drive it, and the resistance in front. If, then, the commencement of systole depends on distention, and its length on very varying factors, it would be very strange if the two sides of the heart were incapable of acting to some extent independently. When the balance of blood pressure in the two sides of the heart is disturbed, it would be a very extraordinary provision in nature if one ventricle had to wait on the other, or prolong its contraction, not in accordance with the work it had to do, but in accordance with the necessity of its fellow. Although in mitral stenosis the right ventricle invariably initiates the contraction, yet in many other conditions the left ventricle acts in advance.

The myogenists tell us that the rhythmic function of the heart is started and maintained by a stimulus generated at the sinoauricular node, and somehow or other this stimulus travels through the auricles down the auriculoventricular bundle to the apex of the ventricles and the papillary muscles, and back again to the base of the ventricles.

What is the nature of this stimulus and how it is propagated God only knows, as the nearest approach to a definition which I have heard is that a *stimulus* is a *stimulus*. In this case it is not Scotch whiskey but just a stimulus to contraction.

Now there are any number of stimuli to contraction—electrical, mechanical, and thermal, but this peculiar stimulus, about which we hear so much, and know so little, defies analysis or definition. If it were called a vitamine any number of medical men would swallow the absurdity. As to its mode of propagation nothing definite is known except that it is supposed to travel along the auriculoventricular bundle, and at the Stannius bridge between the auricles and ventricles it moves very slowly, and like an old flint gun often misses fire. The muscle fibre in this neuromuscular bundle is quite different from the ordinary cardiac fibre and there is no evidence that it ever contracts, and if it does, its doubtful muscularity would point to its contraction being slower than even that of involuntary muscular fibre.

How then can it convey this unknown stimulus as quickly as even a slowly contracting auricle? Some years ago Head suggested, without adducing a tittle of evidence, that this bundle has a wave of contraction of its own, which wave is picked up and reinforced by the ordinary cardiac muscles. We have got a neuromuscular bundle of peculiar construction for which the myogenists seem to have found a use in carrying an imaginary stimulus over the heart—they seem to forget that it might be of use as a nervous as well as a muscular connection between the auricles and ventricles. However, the bundle does not seem to be always necessary for the propagation of a wave of contraction, as Engelmann has shown that when one end of a strip of cardiac muscle is stimulated to contract the other end may follow suit even when the intermediate portion of muscle is frozen.

There are various embellishments of this myogenic theory, such as positive and negative chronotropic, dromotropic, bathmotropic, and inotropic influences. This stimulus runs the risk of being more or less frequently blocked by disease and drugs—especially by that much abused drug, digitalis, so it has been necessary to assume that every healthy muscle cell of the heart has the power of producing a stimulus of its own which it constantly does, and this is as constantly used up with every contraction, so that after each systole the heart is bankrupt of stimulus.

The myogenists have been getting into some difficulties of late with the bundle because there have been cases of heart block where the bundle was afterwards found to be healthy, and cases of normal rhythm where the bundle was destroyed.

Stanley Kent came to the rescue in the *British Medical Journal* of July 18, 1914, with one or more bundles linking up the right auricle and right ventricle and the left auricle and left ventricle.

No doubt these bundles are extremely useful, otherwise they would not be where they are, and probably like the rest of the nervous mechanism of the heart may save that organ from many an unnecessary jar and strain, but how long their function may be misinterpreted it is difficult to say. From a therapeutic point of view, so far as I can see, this apparently learned jargon to which we are regularly subjected leads only to the grave. If the heart comes to a standstill in syncope or chloroform poisoning are you going to wait for the imaginary stimulus to start at the sinoauricular node? If you do there may be an eternal silence. The proper plan is to apply a real stimulus inside the right auricle and ventricle of a pressure of fifty to one hundred millimetres of mercury by hanging the patient up by the heels.

It seems to be forgotten that rhythmic action is the function of all muscle, even the skeletal muscles act rhythmically under certain conditions; witness an ankle or patellar clonus a pressure of six or seven atmospheres will make any voluntary muscle contract rhythmically, and they can be made to obey a certain rhythm by electrical stimuli. The involuntary muscular fibres possess the function or rhythmicity in an especial degree and the more closely the cardiac fibre approaches the unstriped variety of muscle the more highly does it possess the rhythmic quality. Hence the auricles are more irritable and contract more slowly than the ventricles, and the right side of the heart is more irritable than the left. I have seen the right auricle respond to mechanical stimuli hours after the rest of the heart had ceased to beat.

If the heart were actuated by a stimulus generated at the sinoauricular node, then under any given set of conditions the stimulus would be paid out with rhythmic regularity and the heart would work like a clock. Some of our myogenic friends are bold enough to say that such is the case, but those of us who deal in hundredths of a second and who are not content with such gross periods as a fifth of a second, know that such is not the case. Nature is much more accommodating than the postulates of your heart specialist; the heart is constantly adapting itself to the work which it has to perform.

It is pleasant to pass from the speculations of heart specialists to the sound work which was carried on at Cambridge by the late Ralph Mines. He showed how the cardiac contraction is dependent on a difference of electrical potential between the ions within and without the cells. In an experiment which I saw in his laboratory on cutting the calcium salts out of the nutritive fluid supplied to the isolated heart it was seen that the electrical variation preceded the contraction of both the auricle and ventricle, and whether the cause or not of the contraction it began the sequence of events and therefore could not be the result of the contraction. The effect of pressure in stimulating contraction is well exemplified in the isolated mammalian heart when it is supplied with nutritive fluid through the coronary arteries; there is a regular rhythmic contraction and in addition when the right ventricle gets filled with the return current it gives an extra contraction on its own account to expel the fluid.

Every muscle in the body is a miniature battery, and the efficient discharge of its function depends on the integrity of the cell and its electrical charge; these cells are arranged in series, and in the case of the heart linked up by the sympathetic nervous system, or, if you prefer, the bundle of His and its ramifications. In health these batteries work well, but in disease there are many breaks in the continuity of the series. So far as we know, the presence of free calcium ions in the blood and tissues is necessary for effective muscular contraction. The calcium ions diminish the irritability of the muscle fibre, but increase the force of its contraction.

The myogenic theory is very nice and plausible, and deserves to be true, but like a good many other theories, it has not been considered necessary to establish the truth of the premises; not one scintilla of evidence has ever been adduced to show that the muscle cells, or any node or set of cells, generate any stimulus which excites contraction, and there is no information as to the nature of the stimulus. I said in 1906, and I say still, that the socalled myogenic stimulus, or the production of a stimulus of contraction as a function of the cardiac muscle is, as far as I know, purely an inference, possibly a figment of the imagination which exists in the brains of certain writers rather than in the cardiac muscle. Of course there may be such a stimulus, but before believing in it I should like to know what it is. If it were a salt of potassium, or sodium, or calcium, or an alkaloid like strychnine, or some difference in electrical potential, we might form some conception of its nature and action. Regarding the propagation of the stimulus, there is no evidence, but it is assumed that it does travel and that often it is much delayed in its transmission along the bundle of His; often taking more than one fifth of a second to travel eighteen mm., according to Leonard Hill who states: "The rate of propagation of the contraction wave in the heart is so fast, reaching five metres a second or more, that, for all practical purposes, we may say that the contraction of the whole ventricle is synchronous."

(*To be concluded.*)

The Minimum Symptoms and Signs Necessary to Make a Diagnosis of Organic Heart Disease*

By W. S. THAYER, M. D., Hon. F. R. C. P. I.,
Baltimore.

At the outset one must respond to the question proposed for discussion in much the same manner as one is obliged, too often, to reply on the witness stand to the persistent inquiries of the zealous advocate: "That, sir, is a question which does not admit of a categorical answer."

We arrive at the conclusion that organic disease of the heart is or is not present in any given instance, only by the exercise of our judgment upon information gained by the use of our senses, aided by the employment of certain instruments of precision. My dear old teacher, Francis Minot, used meticulously to discriminate between the symptoms and the signs of disease. But signs—diagnostic signs of a disease? How very few there are! Human understanding is too fallible often to justify us in venturing upon absolute statements in matters of diagnosis, and everything, in the end, depends upon the individual human understanding. And in such matters as those which pertain to cardiac diagnosis and prognosis, intelligent understanding cannot be acquired in the classroom, in the library or in the assembly—it can be acquired only at the bedside.

With regard to just such questions as that which is proposed for discussion, a competent opinion in the given case can be formed only after personal study of the patient. Language, alas, even when best employed, is but a poor conveyor of visual, tactile and auditory impressions. And lucidity of language, which depends in the end on studied simplicity of expression, is acquired only when one has learned to love the beauties, and to respect the purity of his tongue. Such simplicity and lucidity of language is, alas, none too common among the doctors of today. One shudders to think how rare 'twould be in the future if some of those naïve enthusiasts, who occupy prominent positions before the public today were to prevail—those naïve enthusiasts who, periodically, for generations, have proposed the abandonment of most of those studies whose immediate utility is not apparent, in order that the youth may be led more directly along the path of least resistance to the career of his choice. I say naïve, for their ideas are not new, and because they forget or ignore that the mastery of one's tongue is vital to real success in most learned professions, and that this mastery is rarely acquired other than through familiarity with, and love of, the classics in one's own and other languages.

The master of his tongue may, in a few strong words or lines, excite in his hearers or readers vivid visual or auditory impressions. But they are impressions. In detail, the impression of no two hearers or readers will be the same. But in diagnosis and prognosis it is often the detail which no word can convey, that inclines the scales of judgment.

For upwards of fifteen years, Dr. MacCallum or Dr. Winternitz and I have given an exercise in which we consider the histories of those patients who have died during the week. The history is given in summary and the impressions of the clinician formed without knowledge of the results of the necropsy, are written and read so that there may be no escape. Dr. MacCallum then shows the pathological specimens and speaks of the revelations of the necropsy. In such exercises, one learns soon that the value of his conclusions concerning an instance of cardiac disease which he has not seen himself, is exceedingly small. No description by another can picture exactly the conditions which have existed. It is obvious that in a discussion such as the present, one can speak on broad lines only, can touch upon certain points, and in the end perhaps, insist on the dangers and difficulties of arriving at a diagnosis rather than seek to establish any definite or absolute rules. I shall accordingly restrict my remarks to the consideration of a few circumstances under which a diagnosis of probable organic disease of the heart may be made upon evidence simple and unassociated with that corroborative testimony upon which we must generally rely.

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*Remarks made in the discussion at the New York Academy of Medicine, December, 1921.

It goes without saying that an accurate history is of the greatest value in assisting us to arrive at proper diagnostic conclusions. Not infrequently where the physical manifestations do not justify a diagnosis in themselves, accurate information as to the patient's past history changes a suspicion to a strong probability—in other words, establishes our diagnosis.

There are conditions under which a diagnosis may be made without obvious cardiac abnormalities on physical examination and where a positive diagnosis of cardiac disease may be made from the history alone.

ANGINA PECTORIS.

Few would deny that a reasonably certain diagnosis of angina may be made from the story of the patient in some instances where there are no physical signs to support the suspicion. Such a diagnosis may justly be made in cases from the character of the pain alone even though its distribution be sometimes most unusual. Let me mention two instances.

Case I.—A man aged seventy-three consulted me with the following complaint: Upon walking up the hill which led to his house, he had, some days previously, been seized by a rather sharp, sickening pain directly between his shoulders; he found himself obliged to stop; so soon as he stopped, the pain disappeared but recurred again if he walked fast. This pain recurred under similar conditions and had become so annoying that he sought advice. Physically the examination showed soft peripheral vessels and a heart of average size with no demonstrable abnormalities; the blood pressure seemed a little high. But the diagnosis was clear. The attacks became more frequent and characteristic and, several years later, he died suddenly, almost without a movement.

Case II.—A man of sixty-eight, three months before consulting me, found that when walking fast he had a pain in the back of his throat. Later this became localized in the upper and lower canine teeth on the right side. He never had this pain until he had walked several squares; it disappeared when he stopped; the same sensation occurred if he went upstairs fast; in the bath tub he felt it when he rose; in other ways, he felt quite well. He was a large man; the measurements of the heart (percussion), though rather large, were not above the normal; the sounds were clear; the maximal blood pressure about 160. Both of the teeth referred to were devitalized. The note on my history card ends with these words: "The infallible relation of the attacks to exertion, the circumstance that he obtains relief the moment he stands still, and that he feels obliged to do this so soon as the pains begin, together with the rather high blood pressure, seem to me to indicate that the attacks are anginal in character." Gradually the attacks became more frequent and a year or two later the patient died suddenly.

There was no necropsy in either of these cases, and it is realized that the question may be raised as to the existence of cardiac disease—that one may ask whether the changes may not have been aortic alone. I admit the possibility, but my own experience has been that typical angina is rare in the absence of cardiac disease.

ENDOCARDITIS IN CHOREA.

Our observations have led us to feel that the diagnosis of acute endocarditis or myocarditis may be made with considerable probability in instances of chorea, where there is a febrile movement of any considerable extent. In an analysis of 808 cases of chorea, 107 were treated in the wards of the hospital. In thirty-five of these, where the temperature rose to 101° F. or above, thirty-one or nearly ninety per cent. showed evidence of valvular insufficiency or stenosis before leaving the hospital or on subsequent examination. If chorea be associated with well marked fever and no definite cause for this fever be apparent, it would appear to be fair to conclude that there is an acute cardiac involvement—endocarditis or myocarditis. It is obvious that unless myocardial lesions sufficient to produce a relaxation of the mitral orifice be present, the early stages of a socalled rheumatic mitral endocarditis could scarcely produce recognizable, localizing symptoms. A soft systolic murmur over the precordium in a child with chorea is no more diagnostic of endocarditis than similar manifestations in a child, healthy or affected by any other febrile disease such as typhoid. The existence of the endocarditis of chorea is commonly discovered only weeks or months after its onset, when sclerotic changes have set in in the affected valve. The small acute verrucosities of the valve can hardly themselves produce appreciable symptoms.

ADAMS-STOKES SYNDROME.

The characteristic Adams-Stokes syndrome with prolonged conduction time justifies the diagnosis of organic cardiac disease, even in the absence of demonstrable physical changes in the heart.

ELECTROCARDIOGRAPHIC EXAMINATION.

It would probably be fair to say that electrocardiographic examination reveals sometimes the only evidence justifying a diagnosis of organic cardiac disease—such as a persistent notching in all leads or evidence of bundle branch block, but these changes are, after all, rarely seen in the absence of other suggestive symptoms.

ARRHYTHMIAS.

Certain arrhythmias—notably persistent fibrillation of the auricles—would probably be regarded by most physicians as evidence of organic cardiac change even though that change be not demonstrable by other clinical signs.

There are conditions in which a murmur alone justifies a diagnosis of organic disease of the heart. So much has been said, and so justly said, anent the misinterpretation of cardiac murmurs and especially systolic murmurs—so much has been said as to the common errors in attempting to estimate the character and extent of the cardiac lesion from the character of the murmur, that it may not be amiss to assert here what is undoubtedly true—that in a given case the only evidence of organic cardiac disease may be the murmur heard, and that not very infrequently one is quite justified in making the diagnosis of organic cardiac disease on the presence of a murmur without other evidence.

AORTIC INSUFFICIENCY.

This is especially true in aortic insufficiency. The murmur of aortic insufficiency is very rarely heard outside of true valvular disease. Only once or twice in my work have I seen instances which appeared to be transient and due to a relaxation of the ring; once in exophthalmic goitre, and twice after typhoid fever. But instances like the following are not uncommon:

Case III.—E. L., aged thirty, consulted me in 1900. He was an athlete, and had been accustomed to taking violent physical exercise. There was no history of serious infectious disease. Two years before he had been told by a physician that he had a slight cardiac murmur and was refused insurance. He thought that on violent exercise he was a little shorter of breath than he used to be.

He was a healthy looking man; the heart was not enlarged; the impulse was under the fifth rib about eight cm. from the median line; there was no enlargement to the right; the sounds were clear at the apex, except for a loud inspiratory, cardiorespiratory systolic murmur; the second sounds were of normal relative intensity; on attentive auscultation, a soft to and fro murmur was audible in the third left space near the sternum; the diastolic murmur was faintly heard in the aortic area and along the left sternal margin with diminishing intensity. My notes read, "There is nothing in the pulse suggestive of aortic insufficiency, though the nature of the murmur would leave little doubt that it is an instance of aortic insufficiency." Five years later, the apex was in the mammillary line, 9.1 cm. from the median line signs as before. I saw this man again less than a week ago. He had remained perfectly well; had ridden to the hounds all his life and led a normal existence. But the heart was a little larger, the systolic murmur at the base had grown harsher; the pulse was smaller and of longer duration and suggestive of a definite aortic stenosis.

Here was a man in whom there was undoubted aortic insufficiency of so slight a degree as to produce little or no cardiac embarrassment. At the moment and through nearly twenty years of life, following, the lesion was revealed only by the presence of a murmur.

MITRAL INSUFFICIENCY.

No man with considerable experience in diseases of the heart can doubt that there may be instances in which mitral insufficiency of organic character may be recognized by the presence of a murmur alone. There are those occasional instances where a slight sclerosis of the valves with insufficiency so slight as to cause no subjective symptoms or no objective evidence of cardiac hypertrophy, are revealed only by the presence of a murmur associated with or replacing the first sound at the apex—a murmur of a character distinctly harsher and louder and perhaps longer than one ever hears in a heart of normal size in the absence of actual valvular insufficiency. An example of this is the following:

Case IV.—E. C., a girl of seventeen, was seen with Dr. I. E. Atkinson in consultation, May 22, 1902. The patient complained of obscure abdominal symptoms, suggesting peritonitis, coming on in the course of an unaccountable fever of about a week's duration. The heart was of normal size. There was a loud, long, blowing systolic murmur heard at the apex and through the back. The second sounds at the base were of normal relative intensity for a girl of her age. Two days later the patient died with symptoms of peritonitis. The necropsy showed a perforated typhoid ulcer. The heart was essentially normal in size with slight sclerosis of the mitral leaflets, and thickening and shortening of the chordæ tendineæ.

Now the diagnosis in this instance was rather simple, owing to the circumstance that two years previously, the patient had had a severe acute rheumatic fever with endocarditis. But it would have been equally clear without it, for the character of the murmur was such as could not have been present other than in organic mitral insufficiency.

In such cases as this, however, the element of personal judgment enters in, and it would be really impossible to attempt to explain to a class of students or to lay down a rule as to when a mitral murmur reaches such a degree of intensity or harshness or duration as to justify a positive diagnosis of disease of the valves. That there are murmurs as to the organic nature of which there can be little or no question in the absence of signs of cardiac enlargement or functional derangement, there is, however, no doubt.

MITRAL STENOSIS.

There is another phenomenon relating to the heart sounds, which in many instances justifies one in diagnosticating a valvular lesion. I refer to the mitral diastolic murmurs—the characteristic, rumbling, vibratory murmurs often associated with a palpable thrill, felt at and just within the apex in mitral stenosis—the murmur most unfortunately, I think, referred to in English and French literature as the "presystolic" murmur of mitral stenosis. These murmurs are presystolic often only in that they extend up to the first sound. They begin generally at an early period in diastole, namely, at the time of the third sound, i. e., at the moment of relaxation of the ventricle, and reach their maximal intensity shortly after this. If the pulse be slow, they commonly diminish in intensity and may cease before the first sound. Auricular systole is a relatively unimportant event in association with these murmurs, and while it may cause an actual presystolic accentuation of the rumble this is by no means always the case. In rapid action of the heart, however, with shortening of diastole, the sounds follow one another in such quick succession that the mitral diastolic murmur ends in the first sound, and is, therefore, presystolic in this sense and seems to be truly crescendo up to this point. If, then, the heart's action be rapid, the murmur appears to be presystolic. If, however, it be slow, one can generally appreciate that the murmur arises and reaches its maximum during the period when the greater part of the blood passes from auricle into ventricle; namely, in the early part and middle of diastole. In any event the murmur, in the absence of aortic insufficiency, is characteristic of mitral stenosis.

The sharp valvular first sound associated with the same condition—mitral stenosis—may alone justify a diagnosis, but rarely, only when it is most intense, as for instance, in cases where the sound is audible at a distance from the heart.. As a rule there must be other corroborative testimony before one is justified in interpreting a sharp first sound as evidence of mitral stenosis. There are few errors in cardiac diagnosis commoner than the assumption of the existence of mitral stenosis on the basis of a sharp first sound alone.

CONGENITAL CARDIAC DISEASE.

I shall not touch here on those murmurs which may justify the diagnosis of congenital cardiac malformations. Such murmurs, as is well known, may, notably in the case of septum defects, be the only positive evidence of cardiac abnormality.

Of manifestations which are commonly and erroneously interpreted as evidence of cardiac disease, I have spoken on another occasion:—the disproportionately large heart in the growing child; the striking movability of the normal heart which with the patient in a lateral decubitus, may give rise to erroneous inferences as to its size; the normal protodiastolic gallop—third sound—in the young; the unimportant systolic murmur in the pulmonary area; the frequency of like murmurs at the apex in the young in recumbent and left lateral postures; the loud cardiorespiratory, inspiratory murmur, so often heard around into the back; the lack of pathological significance of respiratory arrhythmia; the frequency of extrasystolic irregularities in the absence of evidence of cardiac disease.

But I have already done more than your president has asked me to do. He asked me to present a short communication on the "minimum symptoms and signs necessary to make a diagnosis of organic heart disease." I have circled carefully around the periphery of the subject, and discoursed at length on a variety of more or less relevant topics. It is high time that I should make way for those who have something more valuable to say.

1208 Eutaw Place.

Clinical Observations of the Morphology and Function of the Capillaries

By ERNST P. BOAS, M.D.,
New York,
Medical Director, Montefiore Hospital for Chronic Diseases.

The capillaries are assuming an ever increasing importance in our concept of the physiology of the circulation both in its normal and abnormal states. Since Malpighi by his demonstration of the capillary connection between the arteries and veins supplemented and completed Harvey's discovery of the circulation of the blood, the capillaries have been thought of as passive elements in the circulatory apparatus, whose chief function it is to provide a large area in which the exchange of gases, nutritive matters and waste between the tissues and the blood takes place. This aspect of the function of the capillaries is of sufficient importance to merit some emphasis.

The whole circulatory apparatus is adapted primarily to maintain the capillary flow. The regular beating of the heart, the elasticity of the arteries, the peripheral resistance of the arterioles, the mechanism by means of which the venous blood is returned to the heart, serve no useful end in themselves, if we may be allowed to speak teleologically for a moment, but are all adapted and coordinated to keep up a constant streaming of the blood in the capillary vessels. When symptoms of circulatory insufficiency arise, they may be traced to a disturbance in the blood flow in the capillaries. Thus heart failure sufficient to cause chronic passive congestion of the viscera is of significance because the stasis of the blood in the capillaries interferes with the metabolic activities of the organ involved and results in symptoms referable to malfunction of that particular viscus. The blood flow in the capillaries, therefore, is a measure of the efficiency of the circulation and should be of interest to us from that point of view alone.

In recent years another aspect of the problem has been emphasized. It has been shown beyond cavil that the capillaries are not merely passive carriers of the blood but that they have an independent and proper function and share with the heart, the arteries and veins in the dynamics and maintenance of the circulation.

The first observations that suggested that the capillaries have the power of independent dilatability and contractility were made over fifty years ago. In 1865 Stricker (1) studied the capillaries of the nictiating membrane of the frog, and saw them contract and dilate in response to mechanical, chemical and electrical stimuli. He believed that these changes were due to a turgescence of the capillary endothelium. A few years later Rouget (2) confirmed his observations, and described spindle elements in the capillary wall which had the power of contractility, and attributed to them the functional activity of the capillary vessels. In 1878 Severini (3) stated that oxygen caused contraction and carbon dioxide dilatation of the capillaries. His studies were made upon the frog and on the mesentery of the guineapig. They are of great interest in the light of the recent work of Krogh. The following year Roy and Brown (4) published their classical paper on the blood pressure in the arterioles, capillaries and venules of the frog. They, too, demonstrated the independent contractility of the capillaries.

More recent anatomical studies have shown that the capillaries are supplied with nerve fibrils. Hooker (5), among others, has demonstrated constriction and disappearance of the capillaries of the cat's ear on electrical stimulation of the cervical sympathetic nerve. It has also been proved that certain drugs act directly on the capillaries. Thus histamine produces a dilatation—and this is of considerable theoretical interest—and epinephrin and pituitrin a contraction. Nitroglycerine, too, causes a dilatation of the capillaries (6, 7).

Krogh, who has been pursuing some masterly studies on the physiology of the capillaries, has clearly demonstrated the contractile cells of the capillary wall, and by many ingeniously devised experiments has again shown the contractile power of the capillaries. He has found that the capillary bed is constantly changing and that the individual capillaries are opening and closing all the time, so that the blood flow is continually being shunted from one vessel to another. Most interesting of all are his experiments proving the hormonal control of the capillaries. He has shown that in the frog, at least, the capillaries relax and become greatly dilated when there is no pituitary extract in the blood and that the addition of minute traces of this internal secretion to the blood circulating through the part will restore the normal tone and calibre of the capillary vessels.

Krogh has also pointed out that with dilatation of the capillaries their walls become attenuated and thus more permeable to the blood plasma. The bearing that this observation has on the phenomena of inflammation and edema is selfevident.

I have enumerated all of this evidence to show that the capillaries have an active function of their own and that they are not simply passive tubes uniting the arterial and venous systems. It is apparent, therefore, that in studying the dynamics of the circulation we must consider the capillaries as one of the elements concerned in maintaining the blood flow. The corollary of this is that disturbances of the capillaries, either organic or functional, may be reflected in general disorders of the circulation.

The early studies on the capillary function were made on the web of the frog's foot, or on some transparent membrane, such as the mesentery or nictitating membrane, because only these structures lent themselves to microscopic study. The discovery of Lombard (8), that by means of a drop of oil or glycerine placed on the skin the human capillaries could be studied microscopically, opened up a new field of study. When the hand or a finger is placed on the stage of a microscope and a drop of castor oil is applied to the area of the skin to be observed and a strong light is thrown upon it from the side, the capillary loops are clearly visualized, if a magnification of about fifty to eighty diameters is used. The cutaneous capillaries are derived from the subpapillary arterial plexus which lies just below the cutis and ascend in the papillæ of the skin vertically to the surface. By the method employed, therefore, we see only the tangential aspect of the top of the vertical capillary loop. It is so short that observations of the morphology of the capillary and the blood flow are almost impossible. However, at the base of the finger nail the papillæ of the skin are flattened out and, as a consequence, the capillary loops here assume a position parallel to the surface of the skin. They can, therefore, be visualized in their whole length. That is why capillary studies are carried out chiefly at this site. The same area of the toes can be used, but the clumsiness of handling the foot makes it impractical for routine work. The oil on the skin acts just as the oil used with an immersion lens does; it avoids the many irregularities of the skin which reflect and refract the light, so that no clear image is possible.

When we observe the skin at the base of the nail in this manner, the capillary loops stand out very clearly, and we can study their morphology and the character of the blood flow through them. With the aid of a special instrument designed by Danzer and Hooker (9), which is in essence a small transparent air chamber connected with a mercury manometer, by means of which pressure can be exerted on the skin while the capillaries are kept under observation through the microscope, the blood pressure in the capillaries may be estimated.

Let us first direct our attention to the morphology of the capillaries observed in this manner. In discussing variations in structure it is always important to have clearly in mind what is meant by the normal. One sees a row of small hairpin shaped loops just proximal to the cuticle. The next row below these consists usually of shorter vessels which, in the succeeding rows, become still shorter and comma shaped. This is due to the arrangement of the papillæ of the skin described above. The disposition of the vessels and the clearness with which they can be seen depends in part on the condition of the cuticle and of the skin. If the cuticle is pushed far back by manicuring, it will be very difficult to see any long loops. If the skin is thick and scaly, visualization of the vessels will be difficult. If the skin is atrophic and the papillæ are flattened out, many rows of long vessels will be seen and the subpapillary venous plexus may be visible. One must be circumspect therefore in drawing generalizations from the capillary picture observed. The Germans have been guilty of many indiscretions in this regard. Weiss, for instance, has described capillary pictures characteristic of nephritis, arteriosclerosis and a number of other conditions. While there is some truth in his observations, his generalizations are unjustified. For the present it is safest to be satisfied with the statement that disorders that affect the structure and function of the capillaries may exhibit themselves by a change in the capillary morphology. Just as in the arteries, a change in structure usually manifests itself by a lengthening of the vessel with a consequent tortuosity in its course, so the capillaries, in pathological states, become convoluted and lengthened. This may be explained either by an actual alteration in the structure of the capillary wall, or by a disturbed innervation causing a loss in tone of the vessel with consequent lengthening.

There are a few conditions in which the capillary picture appears to be sufficiently typical to warrant especial mention. In hypertension the capillaries are usually long and thin; if much arteriosclerosis exists they are likely to be convoluted and to show figures of eight; in long standing heart disease with repeated attacks of decompensation, the venous loop of the vessel is thick; in acrocyanosis the capillaries are large, long and tortuous; during pregnancy, too, they change their shape.

I have studied eight cases of thromboangiitis obliterans. In all of them one or both legs had been amputated for gangrene developed in the course of the illness. In only two cases was I able to examine the capillaries of the toes. One of these patients suffered from pains in the leg; the other did not. In both of these cases the capillaries of the toes were normal in appearance. One of the patients had lost all of the fingers of both hands, except the thumbs, and the other one had lost the terminal phalanx of one finger; both complained of pain in their hands. Three patients suffered from pains in the hands and of these one had no radial pulse in the left arm and three patients had no pain.

No typical capillary picture was found in those patients with definite evidence of thromboangiitis of the upper extremities.

It is true the capillaries were often long and convoluted and many rows, together with the subpapillary venous plexus, were visible. This picture is seen in a variety of conditions and may be associated in part with the atrophy of the skin over the matrix of the nail bed that is so often seen in these individuals. In a few patients the capillaries were widely separated from one another and there were relatively few to the microscopic field. However, after mechanical stimulation of the skin by stroking, capillaries appeared in the clear spaces, so that the usual number could be counted.

Patient 28 was studied in September, 1921, and in November, 1922. There was no change in his condition in the interval. On both occasions it was noted that few capillary loops were visible. After rubbing the area of the skin with a blunt instrument under observation many anastomosing and branching capillaries came into view. These observations lend themselves to the interpretation that many of the capillaries were tightly contracted, permitting the passage of no blood until the mechanical stimulus brought about their relaxation.

The capillary blood pressure was normal in four cases that were studied.

Spasms of the capillaries have been observed in Raynaud's disease. Halpert describes a typical case. During the attack the number of capillaries visible is unchanged. The larger capillaries become fuller, especially the venous loop, and their contour changes; projections and strictures form. In severe attacks the capillary flow ceases but in the larger capillaries the blood is pushed through the vessel in a peristaltic-like wave. Pribram and Henius describe a similar peristalsis of the capillaries in the stage of ischemia.

With a little practice the blood flow in the capillaries can be visualized clearly. The normal flow is so rapid that it is difficult to follow. It appears rapid only because of the magnification employed for the actual velocity of the blood stream in the capillaries is 0.5 mm. a second. However, it is not the same in all of the vessels in the microscopic field and we see here and there the movement of the corpuscles up the arterial loop and down the venous one. The flow is not constant in the individual capillaries. If we fix on one vessel, we may see at first a slow halting flow. Suddenly it becomes accelerated and so rapid that the eye cannot follow it. At times the capillary may disappear from view altogether, either because it becomes closed or because the blood becomes sidetracked through anastomotic channels into adjacent capillaries. We cannot determine in the cases under observation what the cause for this variation is, but the studies of Krogh have shown that the capillary flow is determined by physiological moments. He has demonstrated (10) for instance, in the frog's tongue that the number of capillaries seen after the muscle has been in action is far greater than when it is at rest. He has also described the dilatation of the capillaries on exposure to carbon dioxide. The capillary blood flow thus responds to the needs of the tissues. It is probable that chemical stimulation by metabolic products and particularly by the relative concentration of carbon dioxide is one of the determining factors in this local variation of the degree of capillary filling.

It is important to realize that local changes in the circulation may occur quite independently of the systemic circulation. Thus in the vasomotor disorders, such as acrocyanosis, it can be clearly demonstrated that during the time that the hands are cold and blue the flow in the capillaries is almost stagnant or, at best, very slow (11). In the same patient when the hands are warm and pink, the blood flow in the capillaries is rapid and uninterrupted. It is interesting to study a patient whose hands are cold and cyanotic and note the sluggish blood stream, and then to immerse his hands in hot water and to see the consequent rapid streaming of the blood. Such patients are often told that their cold hands and feet are due to a poor circulation, a statement which inferentially reflects on the heart. Their disorder is a purely local affair, dependent upon disturbed innervation of arterioles and capillaries.

Dale (12) and Cannon have shown quite conclusively that in shock the essential disorder is a paralytic dilatation of the capillaries. As a result of this paralysis the blood accumulates and becomes pooled in the capillary vessels; the patient, so to speak, bleeds into his own capillaries and there is an insufficient amount of blood in the heart and arteries to carry on the circulation. Hooker (5) has demonstrated photographically the dilatation of the capillaries following histamine shock and recently Freedlander and Lenhart (13) observed it clinically in several patients who were in shock. This is the most striking illustration of the manner in which disorders of the capillaries may disturb the circulation even when the heart and arteries are normal.

Recent studies suggest that capillary paralysis induced by toxemia is responsible for the circulatory failure that accompanies many infections such as pneumonia and peritonitis (14). No other satisfactory explanation has been offered. Indeed, many experiments have been performed to show that neither the heart, the vasomotor centre, nor the arterioles are at fault.

Another interesting phenomenon which is due to the functional activity of the capillaries is the white line of Sergent, which, incidentally, was first described by Marey in 1858 (15), and which has, on insufficient evidence, been called a sign of adrenal insufficiency. The pallor of the skin in this phenomenon is caused by a constriction of the capillaries which become emptied of their blood.

It will occur to everyone that the method of direct observation is well adapted to demonstrate pulsation of the capillaries in the conditions giving what is known as the capillary pulse. I have studied a large number of such patients and have been able to demonstrate that no matter how clear the clinical evidence of systolic flushing of the skin may be, the capillaries do not pulsate (16). In other words, what we have been in the habit of calling a capillary pulse is not a capillary pulse at all. The phenomenon must be due to an exaggerated pulsation of the small arterioles and possibly of the small venules of the skin. We should, therefore, to be accurate, discard the term capillary pulse and speak of the systolic flushing of the skin.

The most interesting aspect of the study of the capillaries is the study of the capillary blood pressure. This has many theoretical as well as possibly some practical bearings. No accurate methods of determining the capillary pressure were at hand until Danzer and Hooker described their microcapillary tonometer. Most of the previous methods depended on the paling of the skin as the end reaction in the measurement of the pressure in the capillaries. The two authors mentioned above pointed out the fallacy of this criterion and by means of their instrument were able to determine the exact point at which the blood flow ceases in the capillaries when pressure is applied to it. They determined that the normal capillary pressure is about twenty to twenty-five mm. of mercury. I have studied a large number of patients with the aid of this instrument and have been able to confirm their studies and to make a number of interesting observations (17).

In a number of cases of severe myocardial insufficiency the capillary pressure was low, the flow sluggish and the capillaries dilated. This is corroborative evidence that back pressure effects with heart failure are not determining factors, but that the sluggish flow is caused by a diminished *vis a tergo*. Furthermore, it suggests an explanation of cardiac edema—as determined by the increased permeability of the dilated capillaries carrying a sluggish current of blood.

The most interesting group of cases are those with hypertension. With Dr. S. Frant and Dr. I. Mufson I have carefully studied forty-seven such patients. Of these twenty-eight had a normal or a low capillary pressure, while nineteen had a high capillary pressure. A normal pressure was one under 30; the high pressures ranged from 30 to 90. The patients were studied clinically from every angle, yet we were unable to establish any clinical criteria which would distinguish the two groups of cases. The degree of hypertension, the kidney function, the duration of the illness, in fact every possible factor was carefully considered, yet no definite rule could be established. In other words, we were presented with the problem—why has one group of patients with hypertension a high capillary pressure and another a low one, notwithstanding the fact that they present similar clinical pictures?

These observations were made a year ago. We have within the last month looked up all of the old cases to determine what has become of them and have repeated the determination of the capillary blood pressure on those who were still alive and accessible. We are not yet prepared to present our final conclusions. It is worthy of note, however, that of the nineteen patients with a high capillary pressure, eight died within a year of the first observation of their high pressure. Of the twenty-eight with a normal or low capillary pressure only five died. It would seem, therefore, that a high capillary pressure indicates an unfavorable prognosis. An adequate explanation of our observations on capillary blood pressures is not as yet forthcoming. That the facts are of significance, I am convinced.

CONCLUSIONS.

In the light of all of the evidence that has been gathered in recent years, we must revise our opinions of the rôle that the capillaries play in the normal and disordered circulation. They are concerned, together with the arterioles, in the maintenance of the peripheral resistance. It may be that their active contraction assists in the progress of the blood from the periphery to the heart. They respond to the local needs of the tissues by dilatation when there is an excess of carbon dioxide; by constriction when this is relieved. They are further under control of the central nervous system and respond to certain stimuli by contraction, thus affecting the blood supply to the part in question. They are probably also influenced by certain internal secretions.

The independent functional activity of the capillaries is responsible for many of the phenomena observed in the sick. Among the most striking of these may be mentioned shock, the circulatory failure accompanying many acute infections, dermographia, urticaria, vasomotor disorders of the extremities including Raynaud's disease. The color of the skin is determined in large part by the degree of filling of the capillaries and venules. A constriction of these vessels will produce a pallor of the skin which may be mistaken for anemia. The capillaries undoubtedly play an important part in the causation of edema. Their rôle in the hypertensive states is still a matter for speculation, but there seems to be no doubt that they are intimately concerned in certain of these conditions. The capillary blood pressure appears to be of some prognostic value—a high pressure being of grave significance. The capillaries undergo morphological changes in the course of disease, just as do the larger bloodvessels.

We are still on the threshold of our knowledge of the pathological anatomy and physiology of the capillaries, but we have learned enough to assign to them an important rôle in the causation of circulatory disorders and to encourage us to seek further light on their normal and abnormal function.

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The Present State of Our Knowledge of Quinidine Therapy in the Treatment of the Fibrillating Auricle*

By LOUIS FAUGERES BISHOP, M.D., SC.D., F.A.C.P.,
New York.

INTRODUCTION.

This paper is to be more in the nature of an appraisal of the value of a new procedure than the report of personal experience and I have drawn freely upon other authors for their conclusions.

There is no question but that the application of quinidine in the treatment of auricular fibrillation has proved to be extremely interesting. It differs from the previous treatments of fibrillation in that it restores function to a type which corresponds to normal. We already had in the treatment of fibrillation by digitalis the most striking example of therapeutic effect in all medicine. It is unfortunate that the new measure should not have pertained to a problem less well covered by therapeutics.

By the proper adjustment of digitalis thousands of persons with fibrillation of the auricle have had their capacity to work restored to them. The slower rhythm in the heart does not, however, conform to the sinus type but remains irregular.

Since fibrillation is a relatively rare disease each general practitioner has a chance to observe only a few examples of this disease. We must, therefore, look to those who have had an extensive experience in this field to settle some interesting and important questions that have arisen.

The first question is whether, when normal rhythm is restored for a time, the benefit to the patient is strikingly better, in the long run, than when the rate has been promptly adjusted.

A danger of quinidine therapy is that embolic infarction of internal organs is of frequent occurrence when old cases are treated. Anyone, therefore, who is familiar with the benign course of fibrillation of the auricle under digitalis therapy would hardly recommend quinidine in instances where important degeneration of the heart muscle is present. The use of quinidine is dangerous and has brought about comparatively few permanent restorations of rhythm. Everyone who handles many persons with auricular fibrillation knows how well many of them do without restoration of rhythm. It is difficult, indeed, to draw any conclusions as to the real effects of quinidine because the natural history of this disease reveals many instances of remittance of attacks extending over long periods of time without any direct therapeutic explanation.

Perhaps one of the most judicious appraisals of the value of quinidine is given in the article of C. C. Wolferth (30). He says: "The use of quinidine in the treatment of auricular flutter and fibrillation is to a certain extent, in an experimental stage, but certain points in respect of the types of cases in which the drug may be employed and details of treatment have been established. The most favorable cases for treatment are those with, 1, relatively good heart muscle and at least fair compensation, and 2, flutter or fibrillation that has been present only a short time. In cases with good heart muscle the restoration of sinus rhythm with the abolition of the mechanical disadvantage to the heart of such profound disturbances of its mechanism as fibrillation or flutter, may be expected to yield good results. But the use of the drug in patients with weak heart muscle is not so likely to be beneficial. Not only is it dangerous to use so depressant a drug as quinidine in such cases, but the chance of restoring the normal rhythm is much less. It is doubtful whether the advantages that may be gained by the restoration of normal rhythm in a comparatively low percentage of cases in this group counterbalances the disadvantage of still further disturbing the compensation in some cases and the possibility of meeting disaster.

"The importance of the duration of flutter or fibrillation has been questioned. It is agreed by most observers that if the abnormal rhythm is of recent origin it is much more easily removed. Not only may a small amount of quinidine be sufficient to restore the normal rhythm, but apparently the recurrence of fibrillation is more easily prevented in these cases.

"In the management of patients under quinidine therapy a close observation should be maintained. The possibility of the rapid development of alarming symptoms makes it necessary that immediate attention be available. Consequently the patient had better be in a hospital or under the care of a well trained nurse. On account of the abrupt changes in the cardiac mechanism it is a decided advantage to make frequent electrocardiographic examinations.

"The sulphate of quinidine has been found preferable to the pure alkaloid in treatment on account of the insolubility of the latter. Thus far the drug has usually been given by the mouth. Because of the possibility of hypersusceptibility of the patient, one or two small preliminary doses, such as 0.2 gram, should be given. If any symptoms develop from such small amounts the treatment should not be undertaken. If there is no hypersusceptibility, larger doses may be given, beginning with approximately 0.4 gram three times a day and gradually increasing to one gram three times a day, in a person of average size. It is probably not worth while to continue a course of treatment more than ten days. After a rest period a second course may be instituted if the first is unsuccessful.

"As soon as normal rhythm is discovered the large doses of quinidine should be discontinued. The problem then changes to one of maintaining the normal rhythm. Thus far the results have not been brilliant, but this may be due in part to lack of knowledge of the proper amount of quinidine the patient should take. It has been customary not to give more than 0.2 gram twice a day. A great deal of work remains to be done in this field. It would appear reasonable to avoid any strain on the heart for a long time after the restoration of normal rhythm, since a strain might be expected to help convert the mechanism back to fibrillation.

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*Read before the Meeting of the American Therapeutic Society, Washington, D. C., May 2, 1922.

"The types of disagreeable effects that may occur during quinidine administration have already been stated. In the present state of our knowledge extreme caution should be observed in giving the drug if any of them develop. Such symptoms as increasing weakness, dyspnea, dizziness or precordial distress or manifestations of cinchonism, such as ringing in the ears, deafness or stuffiness in the head, should call for withdrawal of treatment. The development of a rapid ventricular rate presents a problem. If the fibrillation has been converted to flutter or a transition stage between fibrillation and flutter it is desirable to continue the treatment if possible in spite of tachycardia, since the prospect of the return of normal rhythm is good. But if symptoms of cardiac embarrassment supervene the treatment should be discontinued. Likewise should tachycardia develop before the course of the excitation wave in the auricle has been much altered the treatment would better be stopped.

SUMMARY.

"1. Studies of the physiological action of quinidine have shown that it is a cardiac depressant influencing chiefly the functions of contractibility, excitability and conductibility.

"2. Quinidine has been found effectual in restoring the normal rhythm in auricular fibrillation and flutter in slightly over one half the cases thus far reported.

"3. Quinidine therapy is still in the experimental stage. If it is used there must be careful selection of cases and constant observation during the course of treatment."

HISTORY AND REVIEW OF THE LITERATURE.

In 1853 Pasteur isolated quinidine from the cinchona bark. Quinidine is an alkaloid and an isomer of quinine. In the past it has been used as a tonic and as an antimalarial drug. Quinidine was characterized in the following manner in the *Epitome of the United States Pharmacopœia and National Formulary:* "At one turn recommended as a cheap substitute for quinine. Inferior and obsolete."

Quinine in combination with digitalis had been given empirically in the treatment of heart disease prior to Weckenbach's experiments of 1914.

Weckenbach experimented with quinine and its effect on fibrillation but without constant results. He wrote in connection with one of his reports: "I have since this experience repeatedly given quinidine and had it given, but only in one other case have caused the cessation of the fibrillation."

In 1918 Frey studied quinine, quinidine and cinchonin from a pharmacological viewpoint. He found quinidine combined with sulphate to be the most effective therapeutic agent in the relief of auricular fibrillation.

Frey made subsequent observations in 1921 and reported his results in fifty cases as follows: Out of fifty cases, twenty-one returned to normal temporarily. In six, the fibrillation became a regular flutter. He says that in the majority of cases the auricular fibrillation was benefited, but only four per cent. were relieved where the arrhthymia had continued over a period of one year. He states that cases of auricular fibrillation complicated by heart failure did poorly under quinidine therapy.

Levy in a recent report on the effect of quinidine on the mechanism of the auricle gives several illustrations of cases where the normal cardiac mechanism in auricular fibrillation was restored. However, at the end of his article he states that from his own survey and from the literature the factor which determines whether quinidine is successful or not is as yet not quite clear. He believes it is best to administer as much of the drug in as short a period of time as is consistent with the factor of the safety of toxicity.

In the past three years there have been many clinical investigations as to the effect of quinidine on auricular fibrillation. Among the most significant reports are those of Arnell, Benjamin and Van Kapff, Boden and Neukirch, Drury and Iliescu, Faber and Jenny, Klewitz, Levy, Romberg, Cohn, Cheinisse, Clerc and Pezzi, Heffter, Lewis, Meldolesi, Schrumpf, Arillage, Guglielmetti and Waldorp. At the present moment there are many physicians who are carrying on research work in this field from a clinical as well as a laboratory point of view.

White in his recent article entitled The Action of Quinidine Sulphate in Heart Disease to Abolish the Circus Movement in Auricular Fibrillation, says that "Of a total of 228 cases in the literature, including the thirty-five new cases reported on in the present paper, 130 have shown a restoration to normal rhythm (fifty-seven per cent.)."

If one studies any drug purely from the point of view of cardiac recommendation and regard these statements alone one will be led to believe it has important activities. Therefore, much of the literature must be dismissed as being mere conventional repetition. Nevertheless, a long time ago there were individuals who had a spcific belief in the benefit of quinine in heart disease. Many physicians who are closely connected with quinidine therapy in hospital work at the present time do not make as great claims for the drug as would seem from the quotations from their papers.

Few authors have stated that results were permanent, although some observers believe that by continuing the drug in small doses a prophylactic influence may be exerted so that recurrent attacks of fibrillation are further separated and of shorter duration. One difficulty in the matter is that not many men have studied fibrillation in a sufficient number of cases to have a matured judgment as to the natural history of the condition.

NATURAL HISTORY OF AURICULAR FIBRILLATION.

The fact that fibrillation begins with intermittent short attacks which gradually become of longer duration and finally become permanent, is not always appreciated. Therefore, if a case of fibrillation is treated in the early stages the intermissions which are part of the natural history may be taken as therapeutic results.

Another element of error is that a person may be observed a number of times during a test and never be seen during the intermission so that the impression may be gathered that it is a case of continuous fibrillation when, in truth, it is an intermittent type.

I had under my care an old man who was suffering from fibrillation of the auricle. He was under observation for several months and then disappeared. Two years later he returned for reexamination and his heart was found to be normal in rhythm.

Sometimes apparently firmly established fibrillation of the auricle returns to normal rhythm without specific treatment. These sudden recoveries may be very rare just as spontaneous cure of cancer is most unusual, but there are a sufficient number of these cures to make a single therapeutic observation of uncertain value.

Quinidine has many characteristics which make it a promising remedy for the diseased auricle as in all probability this part of the heart is the seat of disturbance of chemical function with the possibility that there is an underlying infection as a cause. Whether or not the improvement of fibrillation under quinidine proves to be of great clinical importance, the question is bound to arise before the profession whether this remedy should be used for the action which is usually called tonic effect.

In malarial countries it became the custom to use quinine as a tonic probably on the ground of analogy and since people suffering with malaria were improved so much in general health it was thought the remedy might be used for general debilities. A difficulty of interpretation arises from the fact that a heart with chronic fibrillation is subject to improvement and deterioration of condition in the ordinary course of life, irrespective of remedy.

The following data as to the action and uses of quinidine are given in the *Journal A. M. A.* (32).

"Quinidine is obtained from cinchona bark as a byproduct in the manufacture of quinine, to which it is closely related, being the stereoisomer of quinine.

"*Actions and uses.*—Quinidine, like quinine, is a protoplasm poison. It affects protozoa more than bacteria, but less powerfully than quinine. At one time it was used, to some extent, as a substitute for quinine because it was then much the cheaper.

"Quinidine acts upon the heart in such a manner as to bring about cessation of fibrillation of the auricles in a certain proportion of instances. Quinidine and other cinchona alkaloids, are the only drugs known to have this specific effect. The pharmacology of the drug has not been thoroughly investigated; but it is probable that quinidine increases the refractory period of auricular muscle and decreases its irritability and the rate of conductivity. In large doses in the isolated hearts of rabbits, it slows the heart rate and causes paralysis of the auricle; shortens the auriculoventricular conduction time, and results finally in paralysis of the ventricle. Quinidine is used to restore the normal rhythm of the heart in cases of auricular fibrillation. This has been brought about in approximately fifty per cent. of the reported cases in which the drug has been used. It is apparently most efficacious in the cases of fibrillation of short duration or of the paroxysmal type. It may also stop fibrillation of several years' duration. It is least effective in cases of fibrillation with marked cardiac insufficiency. Quinidine is not without some unpleasant and even dangerous effects. Some patients appear much more susceptible to its toxication than others. The untoward symptoms brought about by its use in these patients are nausea, vomiting, convulsions, palpitation, headache, faintness and flushing. In most cases following the administration of the drug, the pulse increases in rapidity before the normal rhythm is established. In some cases the effect of the drug is restricted to this alteration of rhythm. In a few instances, such serious results as rapid idioventricular rhythms (ventricular tachycardia) have been initiated during the course of therapy. Toxic effects may appear after the establishment of a normal rhythm. Some cases have been reported in which sudden death occurred a short time after the drug had been stopped. The effect of the drug is not known to be permanent; but the normal rhythm, when once established through the action of quinidine, may last from a few days to several months.

"Quinidine is generally administered as quinidine sulphate. Commonly 0.2 gm. (three grains) of quinidine sulphate is given as a preliminary dose and is repeated after two hours to determine the patient's susceptibility to the drug, therapeutic administration is begun on the following day when from 0.2 gm. to 0.4 gm. (three to six grains) is given from three to five times daily, for one to three days. As a rule, if the establishment of the normal rhythm can be effected, the change occurs after from one to three days' treatment. The maximum dose per day advised by most authors is from one to two gm. (fifteen to thirty grains). If toxic symptoms occur, the administration of the drug should be discontinued."

The type of person in whom it is probably justifiable to try quinidine therapy is one in whom fibrillation has recently developed and who has been put to bed and the heart brought under control by digitalis medication. If the attack of fibrillation is of recent origin the chances for the restoration of rhythm are good and the danger not great.

On the other hand, quinidine should not be used where there is marked degeneration of the heart muscle and where the condition is of long standing.

It is doubtful to my mind whether it should be attempted in that large class of patients who come for examination once in a month or two, who have chronic fibrillation and who are in very good condition on the moderate use of digitalis. These people do so well over such long periods of time that one does not feel justified in hospitalizing them in the manner necessary for safe testing of quinidine.

We have not found, as a matter of practice, that the administration of small doses of quinidine in ambulant cases produces satisfactory results.

To coin a word from an analogous one I would say that the quinidization of fibrillation patients should be a hospital procedure. A number of alarming attacks in the course of the process is such that immediate help ought to be near at hand while quinidine is being applied.

It is fair to conclude that final determination of the true value of quinidine in cardiac therapy cannot be looked for in the near future unless some one is fortunate enough to make an important discovery as to the true mechanism of the operation of the drug. It, therefore, behooves conservative men at present to withhold judgment on the ultimate effect of quinidine in auricular fibrillation.

The author's references will appear in his reprints.

The Blood Pressure in Angina Pectoris

By ALEXANDER BLACKHALL-MORISON, M.D., F.R.C.P.,
London, England,
Consulting Physician to the Royal Northern Hospital; Cardiologist to Mount Vernon Hospital.

In the third volume of the *Edinborough Hospital Reports,* issued in 1895, there is an article by myself under the title of this paper. In the fourth volume of the same reports, the late Dr. George A. Gibson writes on Cardiac Pain and Its Relief. Twenty-eight years have elapsed since these articles were written. Truly life is short and art long. There is a painful interest in examining such records, as I have done preliminary to writing this article, for those who survive and continue to cogitate on problems which equally exercised friends who now rest from their labors. In the interval much cardiac work has been done but the nature of Heberdens's disease still remains abundantly debatable in many particulars.

The instrumental estimating of blood pressure as we make it today was not at that time practised although conclusions reached on other grounds could be equally valid; some think more. In the article I refer to I demonstrated from auscultatory and sphygmographic investigation that in aortic valvular angina there was a fall of blood pressure during the attack which rose on ventricular recovery.

The precise cause of the pain in cardiac angina is still obscure in many cases. That it is not the same in all may be asserted with some confidence. That its appreciation and expression lie in the nervous system requires no argument. The fount and origin of the pain, however, may be in muscular failure or abnormal irritability or in local lesion which is usually vascular. To maintain this last view is at the moment rather heterodoxy but the heterodoxy of today is often the orthodoxy of tomorrow and the future at times finds itself in agreement not with the views of today but with those of yesterday, that is, with the past. If art is long, opportunity also is fleeting and judgment remains difficult, to quote the immortal aphorism of the Father of Medicine.

Discounting the element of mechanical vascular resistance which has been so ably dealt with by Professor Russell in his work on *Arterial Hypotonus, Sclerosis and Blood Pressure,* here is a prognostic value in determining the approximate blood pressure of the suspect of angina pectoris which has not, so far as one can gather from the literature of the subject, been sufficiently appreciated.

If one has had an opportunity of observing these cases over a term of years, one gains experience which is of practical importance. True cardiac angina appears nearly always to be ultimately fatal, however long the dénouement may be postponed. A period of fleeting anginal symptoms, so slight it may be as to appear negligible, may subside and only recur from time to time in such a degree as to render its diagnosis uncertain and even find seeming explanation in some other visceral hypothesis of more hopeful augury. But the day usually comes in angina vera when the full agony of the classical syndrome leaves little doubt as to the condition with which we have to deal. If this has not an immediately fatal issue all pain may subside, a patient may find himself subjectively in complete comfort and objectively may or may not show any appreciable difference in his usual heart rate or rhythm. But, if we find an instrumental estimation of his approximate blood pressure, though our man to our knowledge has habitually had a blood pressure reaching to a certain height, reveals a notable fall in that respect after an anginal attack, this incontestible evidence of experience justifies our holding the gloomiest prognosis. I may illustrate my meaning by concrete examples.

On May 2, 1921, I was hurriedly summoned to H. M., sixty-nine years of age, whom I had known for forty years and who occasionally consulted me. Twenty years previously he had complained of pains in the chest, which were reported as anginal but they were slight and transient. Nauheim was in vogue at the time. He visited it, liked the place, and disported himself in the warm salt water. Then for several consecutive years fished in the Teich and spent quite a pleasant holiday with apparent benefit at that Teuton Bethesda.

After a time his thoracic discomfort subsided, he conducted business regularly and rarely consulted me. I saw him on July 20, 1920, and found his blood pressure to be 150, diastolic 80, which for a man of sixty-eight might be considered almost normal and certainly indicating no peripheral vascular sclerosis. Examination showed nothing amiss with his heart and lungs beyond a little rhoncus in the latter. His urine was normal and beyond a certain hypersomnial tendency, which he had always manifested, his condition was in no way serious. He made no special complaint of the chest pains, conducted his business comfortably and tooted his gig through Hyde Park regularly curbing his mettled steed without difficulty.

On May 1, 1921, the day prior to my hurried summons to him, when I found him in angina, he had driven a coach and I believe "four" from Richmond to London, retiring to bed in his usual health. The attack occurred in the morning before breakfast. The occurrence of fatal angina after sleep when one would expect refreshment to be at its height is not unusual.

I found the patient in severe thoracic pain which was chiefly felt in the upper central back with radiation first into the left and later into the right arm. His skin was cold and moist, the pulse 60 and intermittent and he expressed the fear of impending death. I injected hypodermically one sixth grain of morphine with 1/120 of a grain of atropine and one sixtieth grain of strychnine. He then inhaled with relief five minims of nitrite of amyl which produced a normal acceleration of pulse. He had no organic heart block. Carefully watched for some hours he regained general comfort and lost his apprehension of immediate dissolution. He was kept strictly in bed never leaving it for any purpose until his death, which occurred ten days after the attack which never recurred. In the interval he had regained complete subjective comfort, took his food well, slept soundly and showed a regular pulse which ranged from 72 to 92.

On May 9th I took his blood pressure and found the systolic reading to be 95 and the diastolic 70. As he was apparently quite comfortable, his continued confinement to bed was considered scarcely necessary by his surroundings but I pointed out that the blood pressure had fallen to that of a child and that he would probably die in his chair if he sat up. He therefore postponed rising.

On May 12th he had passed a comfortable night, taken breakfast, seen a man on business and read his newspaper. He then said he felt rather tired and would lie quietly for a time. Within a quarter of an hour he died quite painlessly, having shortly before death had a pulse of 80.

Soon after attending the patient H. M., referred to above, I was asked to see, in consultation with a practitioner in the north of London, a gentleman who had had several attacks of angina pectoris. A fortnight previously he had also seen another physician who had found his blood pressure to be 130-140. On meeting the medical attendant I inquired what the blood pressure measured and was told that the last noted was as stated. The day on which I saw the patient he had been in his garden and was not in bed when I called. He had proposed consulting me at my own house, and had an attack the day before I was sent for, and it was thought prudent that he should avoid the journey. I found his blood pressure to be 80.

The patient was not at the time in pain, thanked me at the conclusion of my visit for my examination and advice, asked me to mention my fee to his family and stated he would send me a check in the course of the same evening. He died a few hours after I left him. The ailment in this case was familial. His father had died similarly.

From the days of Latham's classical case, that of T. A. (Thomas Arnold of Rugby, several of whose descendants also died of the same disease), to the present time, the sudden overthrow of a heart which had done its work apparently well until the moment of its being struck by the severe pain of angina, has been a notable phenomenon and its explanation has still to be found. It appears as though a certain blunting of the irritability of the heart muscle is induced by the shock of pain which, nevertheless, is not incompatible with continued rhythmical contraction and at times although not always with little disturbance of rate. Moreover, all evidence of cardiac failure as denoted by pulmonary hypostasis may be quite absent. Yet ventricular power is manifestly failing and the low record of systolic blood pressure and its approach to the diastolic is a noteworthy clinical experience and an almost certain augury of approaching death.

These views were expressed by me in a discussion following the reading of a paper on angina pectoris before the Medical Society of London in 1921 and were also fully related in a letter published in the *British Medical Journal* on December 31st in the same year. Similar opinions have since been published by Professor Latembacher, of Paris, who also quotes Paquez as agreeing with him. (*Medical Times and Circular,* January 10, 1922.)

The facts I have narrated suffice to indicate the importance of determining the approximate blood pressure after the anginal seizures although every precaution may, at times, fail to avert a fatal issue.

14 Upper Berkeley Street, W. I.

Factors Concerned in the Production of Heart Sounds and Murmurs*

By E. I. FOGEL, M.D.,
Cincinnati, Ohio.

Sound is produced when a body is thrown by a blow or by other means into a state of vibration (1). It is most simply understood in the vibration of a cord or membrane under tension, and the tenser the body the more likely it is to produce sound, and that of a higher pitch. Thus it is that the tense violin string is made to produce sound when the bow is pulled across it, and so is the tense drum membrane made to vibrate when struck with the drumstick. Similarly do the vocal cords when made tense by the muscles of the larynx and then brought into vibration by the air current, produce sound. In seeking the cause of normal and abnormal heart sounds the same physical conditions, namely, a cord or a membrane under tension, must necessarily be looked for; and in this paper I shall endeavor to show that all intracardiac sounds are produced by similar means and in similar fashion.

There seems to be but little difference of opinion as to how the second sound of the heart is produced. With the beginning of relaxation of the ventricle after the end of systole, when the pressure on the proximal sides of the semilunar valves is lessened, the blood pressure in the aorta and pulmonary artery, which had already been keeping the aortic and pulmonary rings tense, causes the sudden closure of the semilunar valves. The quick closure of these valves, the rings of which are already tense, causes them to vibrate, producing the characteristic second sound. A similar sound is produced by the paper flapper made by children when the valve is suddenly opened with a quick motion of the hand. We are not justified in regarding the vibration of the arterial column (2) as one of the causes of the second sound; because, while the arterial column may slightly modify the sound, it only transmits the vibrations as the air column does when passing the vocal cords.

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*From the Department of Pediatrics, College of Medicine, University of Cincinnati.

A considerable difference of opinion, however, exists as to how the first sound of the heart is produced. Nearly a century ago C. J. B. Williams (3) and somewhat later Ludwig and Dogiel (4), after experiments upon hearts whose blood had been removed, believed that the first sound was largely muscular, and upon these experiments we have based our present interpretation of the first sound. The experiments of Williams are open to question, for we cannot be sure that he eliminated the auriculoventricular valves; and even he, a short time after publishing these experiments, agreed that these valves must be a great factor in the production of the first sound. The interpretation of Ludwig and Dogiel's experiments have also been rightly criticized by Pezzi (5), so that there are no conclusive experimental facts to show that the first sound is even partly muscular. The sounds heard in all the experiments were considerably weaker and were undoubtedly due to causes other than the contraction of the ventricles. The weak heart sounds heard by Williams in part of his experiments may have been due to the closure of the tricuspid valve, and in others by that part of the auriculoventricular valves not compressed by his fingers. It is also possible that these valves were ballooned and closed by the air compressed by the contracting ventricles. On the other hand, Sibson and Broadbent (6) found that in the exposed heart the tying off the venæ cavæ caused the first sound to disappear, so they ascribed the first sound to the movement of the auriculoventricular valves. Most physiologists, however, believe both factors to come into play in the production of the first sound. Yet, can we accept this as truth?

Much explanation is necessary to show how the socalled muscular sound is produced; for if the contraction of the heart is considered a single contraction and not a series of contractions or tetanus as in voluntary muscles, there should be no muscular sound at all (7). Even if it is a series of contractions we could expect a sound but scarcely audible (8). There are much larger muscles in the body than those of the ventricles and their contraction is by no means accompanied by so great a sound as the first sound of the heart. Besides, even this sound is probably due to the vibration of the tendons and the bones to which they are attached. Nor do we find anywhere in nature a similar soft body producing so great a sound. However, innumerable instances can be pointed out where cords or membranes cause sound.

The first sound of the heart is caused by the vibration of the auriculoventricular valves and chordæ tendineæ, i. e., membranes and cords, which are made tense and set into motion by the blood stream thrown against them by the contracting ventricles. Perhaps a more important factor than that of the valves are the chorda tendini. With the closure of the valves and the contraction of the papillary muscles, the chordæ tendineæ are suddenly made tense by the pull from both ends causing them to vibrate. Take a cord or handkerchief in both hands and quickly stretch it and you will get a sound similar to the lub of the first sound. The intimate connection between the chordæ tendineæ and the auriculoventricular valves undoubtedly causes them to vibrate together. The auriculoventricular valves may be compared to the membrane of a drum, the blood stream to the drumstick and the ventricular muscle to the arm. No one considers the arm the direct cause of the sound produced, but the vibration of the drum membrane.

Clinical evidence also tends to prove that the auriculoventricular valves are the cause of the first sound. There is really not so much difference between the second sound called valvular, and the first erroneously called muscular, except that the first is lower in pitch and longer in duration, what we would expect from a larger membrane. In the fetus no difference between the first and the second sound can be distinguished; in the infant, hardly any; it is only in older children and adults, where there is a greater difference in the size of the valves, that any appreciable difference between the sounds can be noted. In mitral insufficiency the first sound is often replaced by its systolic murmur, probably because there is not enough of the valve to vibrate or to catch the blood stream. If the first sound of the heart were due mainly to the muscle, the hypertrophied muscle of mitral insufficiency would cause a much louder first sound. In comparing some of Einthoven's phonogramic tracings (9) of the normal sounds with those of mitral insufficiency, we find that the amplitude of the vibration of the first sound is much smaller in the latter than in the normal. Here too, if the first sound were muscular, the hypertrophied muscle would show greater amplitude of vibrations. In extrasystole, the muscular contraction of the ventricle is often so weak that it cannot force the aortic valves open, yet a fairly loud first sound can be heard; whereas, if the first sound were muscular we would expect hardly any sound at all. Under ordinary conditions, however, the intensity of the first sound does correspond to the force of the contraction of the ventricle because the amplitude of the vibration of the valves and chordæ depends upon the force with which the blood is thrown against them by the contracting ventricles.

Many theories have been advanced to explain the cause of the third heart sound. The only definite fact regarding this sound is, that it occurs at the time of auricular systole. At that moment the muscular rings of the pulmonary veins contract, forming pseudovalves which however do not completely close the orifices. The blood, regurgitating into the veins sets the rings into vibration, producing the soft third heart sound.

Keeping the physics of the production of sound in mind, let us approach the causes of some abnormal heart sounds. Mitral insufficiency can be taken as an example of all insufficiencies. With the contraction of the left ventricle, part of the blood is propelled through the insufficient mitral valve. The mitral valve, a thin membrane, made tense by the ventricular pressure, is made to vibrate by the regurgitating blood, just as the tense violin string is made to vibrate when the bow is drawn across it by the arm. The character of the murmur, whether harsh or soft, will depend upon the thinness and regularity of the edge of the valve. If thin and regular, the murmur is musical; if rough and calcified, more noisy in character. Similarly will a moderator band (10) in the heart, which is thin and regular, when made tense, vibrate and produce a musical sound similar to that produced by the vibration of a string of the harp or banjo.

The problem of a stenosis is, in some ways, similar to the problem of an insufficiency. We have a muscle propelling a stream of blood through a tense membrane, causing it to vibrate. But there is this difference, in an insufficiency the murmur is of decrescendo type, in stenosis the murmur is, at least in its beginning, crescendo, i. e., increases in volume and in pitch. Let us take mitral stenosis as the example. Neuhof (11) mentions that the presystolic murmur of mitral stenosis seems crescendo in character, but that the electrocardiograph sound records tend to indicate that the stenosis is crescendo because it is so near the first sound, yet practically all observers agree that it is distinctly crescendo in character. In aortic stenosis too, but to a lesser extent, the murmur is in its beginning crescendo in character. Gairdner, MacKenzie, Joachim and Hirschfelder, Einthoven and others (12) asserted that the presystolic crescendo murmur of mitral stenosis is produced by the systole of the left auricle driving the blood forcibly through the narrow mitral orifice and that it therefore takes place at the end of auricular systole. Ormerod, Barclay and others (12) state that it occurs in the early ventricular systole. Lately Reid (13) doubting the common belief that the presystolic murmur is produced by auricular contraction, seeks to explain that it is early systolic in time. Otto V. Hoffman (14) seeks to explain this murmur by the auricular blood stream pushing itself through and into the already partially filled ventricle. These contentions may explain how a murmur may be produced but not how a crescendo murmur is caused. D. W. Samways (15) believes that the "murmur is crescendo in character because the auricle can exert an ever increasing pressure on its contents as it contracts, because theoretically the pressure can increase inversely as the cube of the decrease in diameter." But the same condition exists in insufficiencies also, so that all heart sounds should be crescendo in character instead of decrescendo, and if his postulate were true the aortic stenosis with its larger and more powerful ventricle should give us a more marked crescendo tone at the aorta than the auricle does at the mitral. But the same crescendo presystolic murmur can be explained simply according to the physics of sound.

Take a violin and while drawing the bow across the string (use the G), bring the string quickly to a greater tension by turning the key, and you will produce a crescendo tone, i. e., a tone increasing in volume and in pitch. We have a similar condition in mitral stenosis. D. W. Samways (15) brings "considerable evidence to show that the contraction of the auricle normally overlaps that of the ventricle, lasting probably till the moment of the opening of the aortic valves; that in cases of mitral stenosis this overlapping tends to be still further prolonged, invading, therefore, the expulsive portion of the ventricular systole; that the murmur of mitral stenosis (presystolic) goes up to and into ventricular systolic time because the blood flow does likewise." In mitral stenosis as the blood is being forced into the ventricle by the contractions of the auricle, the mitral valve takes the form of a funnel with the convexity into the ventricle. At that moment a smooth diastolic murmur, which usually is decrescendo in character as in insufficiencies, takes place. This is due to the vibration of the mitral valve. The next phase is the beginning ventricular systole. The auricle being not yet finished with its contraction and the ventricle having already begun, we have, therefore, a rapidly increasing tension in both auricle and ventricle bringing pressure on both sides of auriculoventricular ring, thus stretching it and the base of the valves; making the valves more and more tense, producing a crescendo tone. The valve straightens out as the diaphragm does in inspiration. The mitral valve can also be compared to the membrane of a kettle drum whose pitch is raised by tightening the membrane at its ring. The presystolic murmur is followed by the first sound or closure of the valve, which is more snappy because it is more tense and is shorter because the auricular systole being prolonged, auricular and ventricular diastole are closer, thus producing a more sudden relaxation of the mitral valve. Observers (16) have often noticed a short pause between the presystolic sound and the first sound of the heart in some cases of mitral stenosis. This takes place at that moment when the pressure of the ventricular systole is overcoming that of the auricular systole and the mitral valve which had been straightened at the time of the presystolic murmur, is thrown with its convexity toward the auricle, before the vibration of the first sound takes place. On the contrary, however, in those cases of mitral stenosis, where there is a failure of the auricular muscle, or where the stenotic opening is so small that but a small stream of blood can pass through or where the ventricle is failing, no crescendo presystolic murmur will be heard.

The same process takes place in aortic stenosis as in mitral stenosis, but to a lesser extent, because the valve and its ring are smaller. In this case, however, the equalization of the pressure of the contracting ventricle by the increase in pressure in the aorta causes a descrescendo continuation of the primary crescendo tone. In mitral stenosis the pause after the straightening of the valve or the first sound, follows the height of the crescendo.

A presystolic crescendo sound is also possible in any condition where pressure in the ventricle is increased sufficiently to make the mitral ring and its adjacent valve tenser during the end of auricular systole and beginning ventricular systole, so that the auriculoventricular valve is stretched, as is the case in aortic insufficiency where we find the Flint murmur. In other words, we have then produced a "relative mitral stenosis" because the pressure of the ventricle does not permit a complete opening of the mitral valve toward the end of auricular contraction. Flint (17) and Elsner (18) assert that this murmur is due to the regurgitant stream pressing upon part of the valve, but the pressure in an inclosed cavity such as the ventricle must be exerted equally on all parts of the ventricle, mitral ring and valves. The same condition may exist in adherent pericardium or ventricle hypertrophied from any cause (19). In these cases of socalled relative mitral stenosis the auricular muscle also hypertrophies as in true mitral stenosis.

A common finding is a systolic murmur over the aorta, which at postmortem shows very little or nothing pathological to explain it. This is found rather frequently in cases of high blood pressure with dilated aorta. Osler (20) speaks of this condition as a relative aortic stenosis, referring to the narrowing at the aortic ring. Here again we have physical conditions to produce a relative stenosis of the valves. The increased pressure in the aorta keeps the aortic ring tense. Upon the systole of the left ventricle, we have an increasing tension upon both sides of the valve, making it and its ring more and more tense. The stream of blood passing over the valve causes it to vibrate and produces the systolic murmur in similar fashion as the Flint murmur is produced at the mitral. A similar murmur, of course, may take place at the pulmonary valve, when pressure in the pulmonary artery is increased and is not uncommon where we also find a snappy second pulmonary sound. This murmur is by far more important than an accentuated second pulmonary for it shows a greater degree of backward pressure, but it is often misinterpreted as a transmitted mitral regurgitant murmur. It often precedes or accompanies a functional pulmonary insufficiency in a progressive mitral lesion.

Transient systolic murmurs or a louder murmur wherever a valve is already effected, may be heard when there is a temporary increase of pressure. Toward the end of systole of each heart cavity there is normally an increase of pressure on both sides of its distal valve. This pressure must necessarily stretch and make the ring and the valve tenser at that particular time. The stream of blood flowing over the valve segments must therefore cause this valve to vibrate. But the amplitude of the vibrations of these valves are not great enough to produce a sound loud enough to be audible to the human ear. When the pressure is however increased the strength of the entire process is increased so that it becomes audible to the human ear. Bridgeman (21) has found that there is normally a presystolic sound at the apex, which is below the range of human audibility. Morris and Friedlander (22) have shown how often a presystolic thrill is found where the heart's action is accelerated. A greater increase in pressure at the mitral, as we find in aortic insufficiency, amplifies the same murmur so that it can be very easily heard. In mitral stenosis we have the maximum effect, with its very marked presystolic murmur. Of course similar relations exist at all the valves and murmurs may be developed there in similar fashion. Transient murmurs due to increased pressure are often confused with hemic murmurs.

Socalled hemic murmurs at the apex in cases of atonic condition of the general musculature are due to relative insufficiencies of the mitral or tricuspid valves, and are caused by the lax papillary muscles permitting the closed funnel formed by these valves to become somewhat opened. The spiral muscular strands of the ventricles end in the papillary muscles so that a relaxation of these fibres would find greater expression at their free ends in the papillary muscles. The commonly accepted theory of a dilatation of the valvular ring is hardly tenable, because during systole the heart is contracting and its cavity must, therefore, be getting narrower. At the same time, the mitral being pushed toward the auricle, forms a funnel with its convexity toward and into the auricle. Both of these conditions tend to narrow the mitral ring and would prevent any dilatation of it. The pericardium too may be a factor in preventing any undue dilatation of the heart (23). In addition thereto in systole the muscle, forming a ring about the auriculoventricular valve, contracts, further narrowing it. Hemic murmurs are heard closer to the site of the valves because the less tense chordæ tendineæ do not transmit the sound as well and the lack of hypertrophy of the left ventricle does not bring it so close to the chest wall. There is also a possibility that most hemic murmurs originate in the right heart whose musculature is much weaker than that of the left side and more prone to relaxation. The rare hemic murmur which is diastolic can only be interpreted as a relative pulmonary insufficiency. The pulmonary ring in contradistinction to the aortic is easily dilatable (24).

Most authorities agree that the split second sound is due to the asynchronous closure of the semilunar valves. Since the closure of these valves depends upon the pressure within the aorta and pulmonary artery, we can expect to find a split sound where either vessel is called upon to carry a greater pressure and this is often found to be the case clinically. At the apex a split first sound is quite common and since, as we have assumed, the first sound is due to the auriculoventricular valves, these, as in the case of the semilunars, must close asynchronously. This is possible when either ventricle is called upon to exert a greater pressure upon its auriculoventricular valves, closing them a fraction of a second sooner than the other auriculoventricular valves. It is not possible for any valve to be forced to close and relax so quickly as to be reduplicated or that the ventricle could contract and relax so quickly as is explained by some. Split murmurs occur in acute changes of pressure in the various heart cavities and vessels before comparative equalization and synchronization takes place.

CONCLUSIONS.

1. That the most common intracardiac sounds are caused by the vibrations of some valve, with the exception of the first heart sound in which the chordæ tendineæ may play a greater part.
2. That the third heart sound is due to the vibration of constricting pulmonary veins set into motion by the regurgitating blood of auricular contraction.
3. That murmurs of insufficiencies are caused by the vibration of a tense valve set into motion by the regurgitating blood.
4. That the presystolic crescendo murmur of mitral stenosis or Flint murmur is developed by the vibration of the mitral brought to a stretch by the beginning contraction of the ventricle before auricular contraction has ceased.
5. That relative stenoses at aortic or pulmonary valves are produced when there is an increase of pressure in aorta or pulmonary artery.

6. That hemic murmurs are due to valves insufficient because of lax papillary muscles.
7. That reduplicated sounds at both base and apex are due to asynchronous closure of the valves.
8. That this conception of the factors concerned in the production of heart sounds and murmurs, seems to simplify the understanding of the function of the heart. It offers an adequate physical explanation of conditions hitherto not understood.

The author's references will appear in his reprints.

Cardiospasm Associated with Esophageal Diverticula

By PORTER P. VINSON, M.D.,
Rochester, Minnesota.

Diverticula of the middle portion of the esophagus have been observed rather often at postmortem, but rarely have been demonstrated during life. They occur usually in the region of the left bronchus, and are due to healing processes following inflammatory lesions in the periesophageal glands. However, Le Count and Brosch have reported small diverticula of the thoracic esophagus apparently not caused by inflammatory reactions, but by lack of support of the esophageal wall. The contraction of fibrous tissue pulls a small portion of the esophageal wall outward and upward, and produces the socalled traction diverticula. The apices of such diverticula point upward, so that there is no tendency for ingested food and fluid to accumulate in them and increase their size, as is the case in pulsion diverticula.

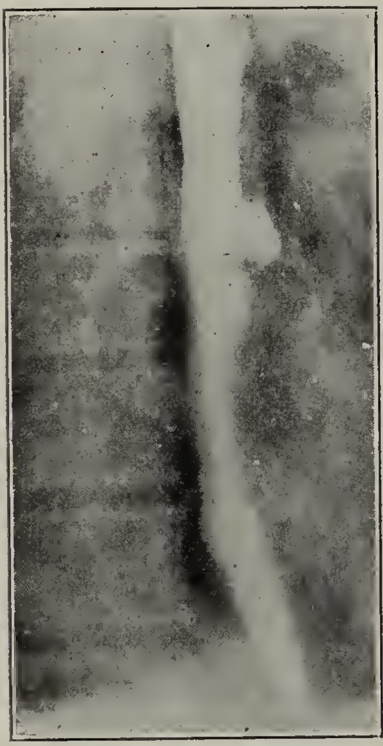

Fig. 1 (Case A392496).—Cardiospasm with slight dilation of the esophagus associated with small diverticulum.

During the past nine months two patients with symptoms and findings typical of cardiospasm have been seen in the Mayo Clinic, in whom a pouching of the left side of the middle of the esophagus was found beside obstruction at the cardia.

Case I (A392496).—W. J. S., a man aged forty-nine years, had had difficulty in swallowing for ten years. The onset of the symptoms had begun with sudden obstruction to food with regurgitation, and inability to swallow either liquids or solids for twenty-four hours. Since that time there had been constant dysphagia with short periods of complete closure. The food seemed to stick in the lower esophagus, and he had had to swallow several times with each bolus before it would pass into the stomach. If it failed to pass it was regurgitated.

Röntgenographic examination revealed obstruction of the barium meal at the cardia with slight dilatation of the esophagus, and a small diverticulum that projected from the left side of the middle portion (Fig. 1). A 45 F sound was passed into the stomach without obstruction, and following this simple treatment, the patient was completely relieved from dysphagia. It is probable that dilatation of the cardia with a hydrostatic dilator will be necessary in order to give permanent relief.

Case II (A417430).—J. E. S., a woman aged forty-seven years, fourteen years before coming to the clinic had noted occasional obstruction of food at the cardia associated with slight epigastric pain. The obstruction increased gradually, but the chief complaint was of pain which had become very severe, radiating to the back and over the left side of the chest. The attacks of pain bore no relation to the time of taking food. The patient said that she was never able to sit down and eat her meals, but was obliged to walk around the room while forcing food into the stomach. As much difficulty was experienced with liquid as with solid food. None of the food had ever been regurgitated.

A röntgenogram revealed an obstruction at the cardia with marked dilatation of the esophagus, and a large diverticulum arising from the left side of the middle portion of the tube (Fig. 2). The cardia was dilated to 28 feet of water pressure with complete relief from dysphagia and pain. Subsequent röntgenograms revealed very slight lagging of the barium meal at the cardia; the diverticulum remained unchanged.

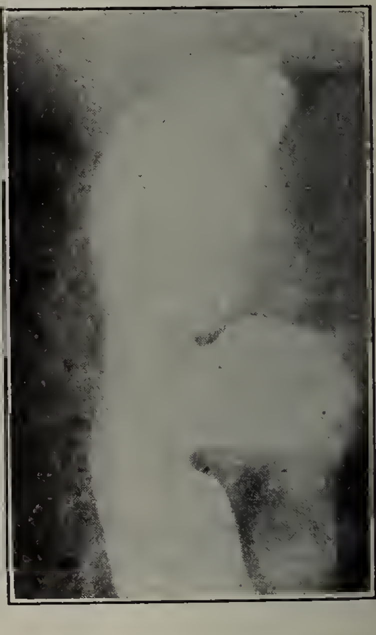

Fig. 2 (Case A417430).—Cardiospasm with marked dilation of the esophagus associated with large diverticulum.

The mechanism of the formation of these diverticula is, of course, purely speculative. They may have resulted from congenital weakness of the esophageal wall, or they may have had their origin in tiny traction diverticula. In either case they could not have attained considerable size without the spasm at the cardia causing retention in the esophagus, and adding the pulsion force necessary to increase the size of the pouch. It is interesting that neither of the patients had symptoms suggesting that the diverticulum was a factor in the production of the dysphagia. It is possible that the second patient will have food obstruction from the diverticulum at some future time, but if this occurs, food can be given through a stomach tube which has been guided beyond the sacculation on a previously swallowed silk thread.

The Circulatory System in Tuberculosis*

By F. M. POTTENGER, A.M., M.D., LL.D., F.A.C.P.,
Monrovia, California.

In order to understand how the circulatory system is affected in tuberculosis it is necessary, first, to understand normal conditions, and second, to understand what there is in tuberculosis which disturbs this normal action. The circulatory system provides the water for the body cells: 1, in which they live; 2, from which they take up the substances which are necessary to their life and activity, and 3, into which they give off products which have a regulatory effect upon the organism and deleterious products which result from their activity.

The body cells are capable of taking up and giving off water. This water content is subject to change from time to time under varying conditions, which depend upon their acid base balance. This varies with many pathological states which are met in practice, such as toxemia, anaphylaxis, asphyxia, and anesthesia. Any change either toward greater or lesser alkalinity on their part increases their water absorbing power and correspondingly decreases the relative amount of free water in the tissues. The amount of water that can be absorbed beyond the normal, as given by Fischer (1) is surprising. He says that even the difference in absorption of water by the red and white corpuscles in venous blood under the influence of carbonic acid concentration as compared with arterial blood amounts to from five to fifteen per cent.

Any marked variation in water content is accompanied by corresponding variation in function, but just what effect this exerts upon the individual we do not yet fully understand. A slight variation in the acid base balance of the cells in the nature of an increased acid content is expressed as fatigue; a marked variation is at least accompanied by such gross disturbance in physiological balance as is represented by malaise, lack of endurance, loss of strength, loss of appetite, digestive disturbance, aching, rise of temperature, and, if the brain cells are involved, delirium and coma. Therefore, it should be a part of clinical study to determine what factors disturb the acid base balance of the body cells and the free water balance of the body, and what part they play in the production of symptoms.

The heart and bloodvessels form the system which keeps the body cells supplied with water, and if the cells are to work to best advantage this function must be carried on regardless of the changes which occur in the water containing power of the body cells themselves and regardless of the amount of free water in the body. It will be readily understood that anything which disturbs the acid base balance of the cells and changes the amount of free water in the body or reduces the functioning power of the heart or alters the texture, elasticity or size of the vessels, will interfere with the efficiency of the circulation. In tuberculosis there are conditions which are inimical to circulatory equilibrium, which produce their effects in each of these ways.

In discussing a disease with so many and so varied manifestations as tuberculosis, it is necessary to make plain that it causes changes in the organism which vary from disturbances in equilibrium scarcely perceptible to those which impair the action of every system. It is further necessary to realize that the circulatory disturbances will vary accordingly.

Tuberculosis is an infectious disease and when active gives origin to toxins which gain access to the blood stream and produce their deleterious effects on the body as a whole. Toxins show a particular affinity for the nervous system and through their action on the vegetative system affect every tissue of the body. One effect of toxic action is to make the tissues more acid. As a result of this they bind more than the normal amount of water, and are disturbed in the normal performance of their function. The heart and bloodvessels bear their share of this injury. Not only is the amount of free water reduced by this reduction in normal alkalinity, but, if the reduction be very marked, the function of the cells is disturbed and existence of the body as a living unit is threatened.

Conditions are often met in tuberculosis, particularly in the advanced phases of the disease, in which circulatory efficiency is disturbed by alterations in the character of the circulatory fluid and in the efficiency of action of the body cells themselves. All changes of this kind throw extra burdens upon the circulatory apparatus at a time when the efficiency of the heart and vessels is reduced because of other handicaps which will be mentioned later.

The mechanism of the circulatory apparatus is interfered with in many ways which are evident to clinical observers. In discussing the competency of the heart and bloodvesesls to meet the circulatory needs in tuberculosis, we have very different conditions to describe in early and in late tuberculosis. At first the heart is fully competent to cope with all factors which interfere with it. The toxic effects are slight and whatever reflex disturbances are present are unable to make serious impression; consequently, except under undue stress, the heart is able to maintain its physiological balance. In more advanced tuberculosis, the physiological reserve is used up and the heart functionates at a disadvantage.

The heart undergoes degenerative changes as toxemia becomes chronic; and the patient approaches an extensive disease which is accompanied by many conditions which call for increased circulatory demands, with a heart which has been deprived of more or less of its reserve strength.

Toxins act upon the nervous and endocrine systems as a whole but cause peripheral effects which are expressive of stimulation of the sympathetic nerves and sympathicotropic glands of internal secretion. This tends to accelerate the heart action and to disturb the vasomotor equilibrium.

Pulmonary tuberculosis and pleurisy both reduce the mechanical action of the diaphragm. The diaphragm is the most important muscle of respiration. It has a pistonlike action and when it contracts (descends) it enlarges the thoracic and reduces the abdominal area. The effect of this is to dilate the lungs and the right auricle thus favoring the ingress of air to the lungs and blood to the heart. At the same time there is also an active force exerted upon the great blood containing reservoirs of the abdomen by the compressing action of the diaphragm, by means of which the blood is literally squeezed out, as described by Wenckebach, (2) like water from a sponge. This aspiration of blood into the right heart by the inspiratory act is one of the important extracardiac mechanisms by which the circulation is maintained.

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*Read before the Twenty-Third Annual Meeting of the American Therapeutic Society, Washington, D. C., May 2, 1922.

Decrease in the inspiratory act is recognizable in very early cases of pulmonary tuberculosis, because the strong crura of the diaphragm are innervated by the phrenic nerves and through them are thrown into spasm when the pulmonary parenchyma is inflamed. In advanced cases this effect is more marked and more easily recognized. In many cases of pulmonary tuberculosis, pleural adhesions, particularly at the base, are also present as another factor in producing the same effect. The lesion in the lung itself by decreasing the elasticity of the tissue also reduces the normal inspiratory excursion.

As a result of all of these factors the blood pressure is low, the arteries of the body are relatively empty, and the veins are relatively full. Most patients who are even moderately advanced in the disease show some cyanosis. In many cases of far advanced tuberculosis large areas of pulmonary vessels are obliterated. One would naturally think that this would throw a tremendous overload on the heart and, in fact, that has been the teaching; but experiments have been performed on animals in which one half of the pulmonary area has been removed without showing any lowering of the systemic blood pressure. The remaining vessels dilated to such an extent that the circulation was carried on with no recognized embarrassment. It is also a common experience today in inducing artificial pneumothorax to collapse an entire lung. This may be done without producing any serious circulatory embarrassment. While these facts show that the heart is able to withstand whatever extra burden is thrown upon it by this procedure, yet it would not be safe to advance them as arguments to prove that no extra load is thrown on the heart by destroying large areas of pulmonary vessels. These observations must be interpreted rather as showing that, in instances where no untoward effects appear, the heart is able to carry on its function in spite of the decrease in vascular area.

The heart performs its function best when lying freely in the pericardium in its normal bed between the two lungs; however, if any considerable amount of lung tissue is destroyed in one lung, either by cavity formation or fibrous changes, that lung contracts and becomes smaller. The opposite lung takes upon itself a state of compensatory enlargement. The result is that the heart is disturbed in its relationships to the surrounding tissue. The contracting lung often withdraws that portion which is normally interposed between the heart and the chest wall and the enlarging lung on the other hand increases correspondingly in volume that portion of its tissue which lies between the heart and the chest wall.

Another condition which militates against its normal working is the shifting of the heart to the right or to the left with the pathological changes which occur in the pulmonary tissue. Sometimes the heart, following a contracted right lung, will shift entirely to the right of the median line, and more often following a contracted left lung will shift to the left. In some cases the entire organ lies considerably beyond the left border of the sternum. As the heart shifts its position it is compelled to functionate at a corresponding disadvantage.

Pleuropericardial adhesions also interpose obstacles to normal action. In instances where the heart is markedly shifted to one or the other side the pericardial space is encroached upon since the sac cannot move *in toto* because of its attachments. Instead of having the heart moving freely and unrestrictedly in the pericardial sac, we have it pushed over to one or the other side of the pericardium while the other is encroached upon by the compensatorily enlarged lung. In other instances we find an adherent pericardium which embarrasses the heart in its rhythmical contraction and expansion.

In pulmonary tuberculosis the innervation of the heart and its endocrine control too are disturbed. During toxemia the action of the sympathetic nerves and such sympathicotropic internal secretions as that from the adrenal body and the thyroid increase the tendency to accelerate the heart beat. This is also favored by the shifting of the acid base balance (acidosis) which results from the toxins as well as many other causes. On the other hand, the pulmonary vagus of the parasympathetic system is stimulated and sends reflex impulses to the heart which attempt to slow the contractions. The resultant rate depends upon the relative strength of these opposing stimuli.

In this brief discussion I have attempted to show a few of the complex factors which are operating to disturb the normal circulatory efficiency in pulmonary tuberculosis and from this we may draw conclusions how to aid the circulatory mechanism in its service to the organism during the time that the body is combatting the disease. It is evident from this description that there is practically no therapeutic problem as far as the heart is concerned in early clinical tuberculosis, but that the problem grows and becomes a serious one as the disease advances with its prolonged toxic action and its tissue destruction. When we say, then, that early tuberculosis is practically always curable, the cure of the patient at this favorable time should be the answer to the heart problem. But it will not be, for cases of advanced tuberculosis will continue to be found which we as physicians will be called upon to treat.

The particular group of symptoms which destroy the tuberculous patient are those which are due to the toxins. As a part of the general action of toxins there is a disturbance in integrity and functional activity of all body cells. The heart and bloodvessels share this injury and it is probable that this proves to be the one greatest factor in interfering with the normal working of the circulatory mechanism. It is reinforced, however, by many others which increase its difficulties.

Therapeutic measures in advanced tuberculosis should be directed first toward warding off toxic effects and second toward improving circulatory efficiency when it is disturbed. Needless to say rest is the most effective of all measures of relief which can be directed toward the heart. This is evident from the fact that it requires six to eight times as much blood for muscles in action as it does for muscles at rest, and that the lungs are called upon to furnish six to eight times as much oxygen to provide the increased energy. Translating heart contractions into terms of work the heart does an amount of work daily equivalent to raising a ton weight one hundred and twenty-two feet. Exercise increases this and active tuberculosis interferes with the normal circulatory mechanism and forces the heart to work at a disadvantage. When the disease is active rest should always be prescribed for safeguarding the heart as well as for its beneficial effect upon the disease as a whole.

Since the main heart condition met in tuberculosis which is directly traceable to the disease is of the degenerative type there is little in the way of therapy that can be applied when once the organ begins to show signs of weakening. Strain upon the heart muscle usually manifests itself by vague symptoms. The patient begins to show signs of nervousness, irritability, anxiety, insomnia, lagging appetite, and usually disturbed digestion. Rarely is pain present, although it may be at times. This condition should be met by rest, mental and physical. Bromides and opiates will aid in bringing about both, although the latter should be discontinued as soon as the critical condition is past.

Digitalis in large doses, twenty to thirty drops of tincture three times a day, should be administered for its effect in slowing and strengthening the contraction and thus favoring the filling of the coronary arteries and improving the heart's nutrition. Digitalis should not be given in small doses, but in sufficient amount to produce slowing of the pulse or nausea within a very short time. Intravenous preparations are even better than those given by the mouth. If the heart passes the crisis digitalis should be kept up for some time. I usually give it for a few days, then discontinue for a few days and resume again. Little help should be expected, however, when frank dilatation comes on as a result of the disease, for then therapeutic measures are too late. The heart has fought its battle and lost.

One must always bear in mind that conditions of toxemia are accompanied by an increase in acid radicles in the body cells and a decrease in free water in the body. While the degree of acidosis may not be severe, yet, lasting as it is apt to do over a long period of time, it produces its deleterious effect upon the organism as a whole. It may be combated by the administration of alkalies. It is my custom to combat this condition by the use of bicarbonate of sodium. I administer about ninety grains a day for a period of several weeks, then discontinue for a week or two and resume again. It should be accompanied by large quantities of water, so as to keep an ample free water supply for the body cells. Or it may be used by the Murphy drip, employing a three per cent. solution and continuing three to four hours a day for two or three weeks or more at a time.

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The Use of Digitalis in Hearts with Regular Rhythm

By LESLIE T. GAGER, M.D.,
New York,
Instructor in Medicine, Cornell University Medical College; Assistant Physician, Cardiac Clinic, New York Hospital.

So large a share of attention has been drawn to auricular fibrillation, especially since the therapeutic possibility of its restoration to sinus control has been shown, that there is a tendency to slight a field of even greater importance, namely, the treatment of the regular heart which begins to show the signs or symptoms of insufficiency. For in those patients, whose damaged hearts still maintain normal sinus rhythm, the efficient use of digitalis affords the double opportunity of promptly relieving distress and disability and preventing or indefinitely postponing the graver events in the progress of heart disease. Here, in these hearts with regular rhythm, the recognition of decompensation, however mild, is as much to be desired as the early detection of glycosuria in diabetes, with the end in view in either case of enabling a vital organ to do what work it can with the least strain.

Nevertheless, as Mackenzie has pointed out, too little attention continues to be paid to early heart failure; and in all degrees of cardiac insufficiency, and more particularly when the rhythm is still regular, it remains only too commonly true that the small doses usually given fall short of the digitalis effectiveness that should be and can be obtained. The importance of proper digitalization, then, in the face of the so frequent abuse or even omission of digitalis, is a subject that warrants repeated emphasis.

Ambulant patients encountered in office practice and in the cardiac clinic provide typical instances of the relief from digitalis therapy that may be obtained in both mild and more advanced states of insufficiency.

CASE I.—B. W., aged twenty-seven years, married, an actress, sought treatment of a throat specialist because of a catarrhal condition that was interfering with her singing, and was referred by Dr. I. W.

Voorhees because of her history and heart murmur. The family history was irrelevant. At nine years of age she had had an attack of acute rheumatic fever, and was kept in bed for one year. At ten, her tonsils were removed, incompletely. When she was fourteen years old there was a second illness, of six weeks' duration, with acute rheumatic fever, and at twenty-three years a third attack, following which the patient was told she had a weak heart and was kept at rest for five months. Her tonsils were taken out completely at this time. For the last four years she had suffered fever from slight dyspnea on exertion. The bowels had been constantly irregular. Following removal of the ovaries at nineteen, menstruation ceased and there was a period of nervousness.

After a summer at rest in the country, during which her weight went up to 114 pounds, the patient returned to her work, which required considerable exertion for a half hour period twice a day. In two months her weight fell to 105 pounds. Her breathlessness increased, and for two weeks she had had to use two pillows at night. There had been no cough, no swelling of the ankles. For a week there had been a full feeling in the precordial area, and palpitation. She was suffering from sleeplessness. She drank a cup of coffee every morning and every evening; she did not smoke. Her appetite was poor.

Physical examination revealed a woman slightly underweight, with pallor of the mucous membranes. The pupils reacted normally, the teeth were in good repair, the tonsillar beds were clean and the lungs were clear. The heart was slightly enlarged, relative dulness extending 8.5 cm. to the left in the fifth interspace and three cm. to the right in the third interspace. Though the chest wall was thin, the impulse was slightly overactive. There was a blowing systolic murmur at the apex, partly replacing the first sound and transmitted into the axilla. There was no evidence of stenosis, even after exertion and change of position. The second pulmonic sound was accentuated. The apex and radial rates were 80 a minutes, regular in rhythm. The blood pressure was 115/70. There was no enlargement or tenderness of the liver, no edema.

A condition of rheumatic heart disease with mitral insufficiency was obvious, but the examination was not nearly as good evidence of an incompetent heart as the history of increasing dyspnea and fatigue. Therefore tincture of digitalis was prescribed according to a schedule that brought the total to 210 minims, the approximate tolerance for her weight, thirty-six hours after her visit, following which one daily dose of thirty minims was to be taken. The temptation to prescribe a sedative was resisted. When the patient returned on the sixth day, she was able to report that her shortness of breath was gone, that she was sleeping all night on one pillow, and that the palpitation and fullness had disappeared. Her pulse rate was 68 and regular. She had had no nausea. The daily dose was diminished to twenty minims, and on this she has been keeping her engagements without further trouble. Under observation, entire withdrawal of the digitalis may be possible.

Case II.—This patient, D. W., aged thirty-nine years of age, married and the mother of three children, is an example of more serious heart disease. She was sent to the Cardiac Clinic of the New York Hospital on August 31, 1922, because of increasing shortness of breath and swelling of the legs. Her family history was unimportant. In childhood she had had inflammatory rheumatism and she gave a definite history of another attack in 1918, since which time she had noticed shortness of breath and some swelling of the ankles. She went through her pregnancies without complications, but for several years had suffered from typical gallbladder attacks. She was admitted to the first surgical division of the New York Hospital on June 20th, and the diagnosis of chronic cholecystitis and cholelithiasis was confirmed at operation by Dr. C. E. Farr. She had a definite mitral stenosis and insufficiency. The Wassermann test was negative. She was discharged, after an uneventful postoperative course, on July 12th, to go to the country for convalescence. The patient received no digitalis during her hospital stay. In the country, a hoarseness, which the patient said later she had noticed soon after the operation, became marked, and finally she was advised to go back to the city for throat treatment. Since July 15th, she had been sleeping on three pillows and had had a cough and had lost her voice entirely for a week.

Physical examination showed a woman of good nutrition, weight 140 pounds, with moderate cyanosis and dyspnea, and slight distention of the large veins of the neck. She was unable to speak above a whisper. The upper air passages were negative. There were moist râles at the bases of the lungs. A forceful impulse was present in the fourth and fifth interspaces in the left nipple line and relative cardiac dullness extended ten cm. to the left and 3.5 cm. to the right. No definite widening of retromanubrial dullness was made out. The murmurs of mitral stenosis and insufficiency were outspoken and the regular rhythm was interrupted by twelve to sixteen premature beats a minute, many of which were frustate contractions, the apex rate being 96, the radial 84. The liver was not swollen. There was a slight pitting in the pretibial regions.

The diagnosis of left recurrent laryngeal paralysis was confirmed the next day on consultation, by Dr. J. P. Erskine. A six foot plate showed considerable enlargement of the cardiac shadow, with the shadow of the left pulmonary vein prominent. The electrocardiogram showed large P waves as evidence of auricular hypertrophy and many auricular premature beats. Digitalization was begun immediately, 120 minims of the tincture being given the first night, and forty minims twice a day for the next two days, so that the patient reached her calculated tolerance forty-eight hours after the course was begun. Thereafter, twenty minims twice a day was ordered. On her return to the clinic on September 7th, the pulse rate was 80, there was no deficit, and only occasional premature beats. Dyspnea and cough were less and there was slight return of the spoken voice. Continuing digitalis, twenty minims twice a day, on September 14th the voice was nearly normal, and cough had disappeared. On September 21st, the voice was unimpaired. The rhythm was entirely regular at the last two visits.

Unfortunately for the patient, she felt so well that she broke two rules: she became intermittent in her use of the digitalis and she did some heavy lifting.

Two days later, on November 2nd, she had to be admitted to the hospital, displaying much cyanosis and dyspnea and a rapid laboring heart. Her voice was somewhat hoarse on the day of admission but with rest in bed and digitalis this vanished and her improvement was rapid. During the next six months under digitalis she continued in good condition.

What has been said of the treatment, and the results of treatment, of the two patients, taken as types of mild and of more serious decompensation, is true of the majority of hearts, which, though still regular in rhythm, have depleted their reserve and are manifesting their inability to carry their loads by overactivity, dilatation, various degrees of passive congestion, and the attendant symptoms. It is the rule that, irrespective of the cause of cardiac disease, digitalis may be expected to exert its influence through bringing about increased power of contraction and control of rate, though it is obvious that a myocardium, the seat of longstanding disease and degeneration, cannot be restored to the function which was possible earlier in the disease process. Now if decompensation progresses, the common termination is the condition of which Lewis has said, "There is no ailment in which such success can be achieved, no other cardiac disorder which may be so speedily benefitted as the well managed case of auricular fibrillation. . . . As a direct result of active treatment the moribund may be restored and many years be added to their lives." But it can be as confidently asserted that active digitalis treatment may do as much for the regular heart, along, of course, with the fundamentals of rest, diet, care of infection, and the rest. Indeed, not only may the failing organ be restored to efficiency, but it is quite possible that the onset of auricular fibrillation may be postponed or prevented. The subsidence of the auricular premature beats in our second patient suggests such a happy result. It will not be gainsaid that it is more desirable to avert fibrillation by digitalis early, than to restore it later to sinus rhythm, in half the cases, and impermanently, by quinidine.

If there can be no question as to the benefits of efficient digitalis therapy, the essential points are to know when and how digitalization is to be carried out. The indications in the regular heart vary from the slight dyspnea, rapid and increased heart action, easy fatigue and mental distress of mild insufficiency, to the cases with extensive edema and other signs of passive congestion. Occasionally only one frank sign or symptom will be present, as in the instance of a man with complete heart block, for whom, without slowing of an already irreducible ventricular rate, a full course of digitalis brought pronounced relief from dyspnea. Undoubtedly rest in bed alone would benefit many of these patients, but in general we are dealing with individuals who must be ambulant.

While much digitalis is given where it is not needed, the greatest abuse in its use continues to be that it is given in doses that are not effective because they never catch up with the rate of elimination. It becomes a problem in arithmetic: if ten drops are given three times a day, and two drops equal a minim, and elimination is at the rate of twenty minims a day, when will digitalis effect be secured? Yet nothing more clear and concise has ever been said of what is required of digitalis than Withering's words 140 years ago: "Let the medicine be continued until it either acts on the kidneys, the stomach, the pulse or the bowels; let it be stopped upon the first appearance of any one of these effects." To these, the effect on the respiration has been added by Christian.

The administration of digitalis, at the outset of treatment, by the large dose method should supplant the small doses, though the latter remains preferable when an uncertain amount of digitalis has been recently given and when there ensues, under digitalis, increasing frequency of premature beats, a condition which is manifestly difficult to ascertain in ambulant patients, but is apparently very rarely serious, if one may judge from the absence of such consequences, as ventricular fibrillation. From his hospital experience, Christian has stated that an instance of harm from digitalis given by the outside physician has never come to his attention. For the large dose method, there are two important facts to be known: the patient's weight and the strength of the digitalis preparation. The working rule with a good tincture is to give two minims to the pound of body weight to obtain full digitalization. This approximates the amount required when the digitalis is so standardized that one hundred mg. of leaf is equivalent to the cat unit, 0.15 cat unit being required to the pound for the patient. Thus for a man of 150 pounds, the theoretical dose of tincture is 22.25 c.c. of tincture, or 330 minims, in comparison with 300 minims by the rough calculation. The schedule of administration of the total may be varied, but in general, one half of the calculated amount may be given at the first dose, one fourth six hours later, an eighth of the total amount at the end of the second six hours, and then in tenths of the total dose until the effect is secured. For people at work, a twelve hour schedule in often more convenient, and later, a single daily dose is as effective as the same amount divided.

The measuring of the doses is obviously important—one convenient way of insuring accuracy is by using the cubic centimetre graduate (one c. c. equals fifteen minims) and another is by diluting the tincture so that a teaspoonful dose equals ten, twenty, or thirty minims as desired. The powdered leaf (one grain equals ten minims) in the form of tablets is also an accurate method and sometimes will be taken when the patient cannot retain the tincture.

SUMMARY.

The value of digitalis in hearts with normal sinus rhythm is discussed, with illustrations of its effect in both mild and marked cardiac insufficiency. Compensation is restored, with prompt relief of symptoms. The more serious consequences of heart failure may be prevented. Thus, the disappearence of numerous auricular premature contractions under digitalis would suggest the checking of a process that might (there is no basis of proof) go on to auricular fibrillation.

Full digitalis effect, it is emphasized, is essential for securing maximum therapeutic benefits, in which respect much of the current use of digitalis falls short of what is easily possible.

Practical considerations in digitalis administration are presented.

131 East Sixtieth Street.

Heart Disease in Relation to Marriage and Pregnancy

By W. W. HERRICK, M.D.,
New York.

HEART DISEASE AND MARRIAGE.

Every practitioner of medicine is asked the question, Should a woman with heart disease marry? No general answer to this question can be given, each case having to be decided on its own merits. If the patient has an aortic insufficiency the physician must remember that syphilis may be the underlying cause. The same is true of patients of childbearing age with anginal pain or general myocardial insufficiency without obvious valvular lesion. Such subjects having a definite syphilitic background should not marry. In the first place, their expectation of life is very short, as a rule not more than three years. Again, there is danger of the transmission of the underlying disease, to the offspring. Decision in the more ordinary forms of heart disease, which are the result of rheumatic fever, scarlatina, or other infections, is a less simple matter. The economic side of the question is not unimportant. If marriage brings increasing anxieties and added physical burdens to a patient who is barely holding her own in the protection of her own home, the venture is probably unwise. On the other hand, if marriage is to bring added comfort and less of effort to the cardiac patient, the opposite view might be taken in the individual case. In general, patients who have suffered a break in compensation and who, within two years, have been confined in bed because of dyspnea, edema, anginal pain or attacks of pulmonary edema, should avoid the added burdens of matrimony. In making a decision, the physician has four kinds of evidence to consider: 1, symptoms; 2, physical signs; 3, exercise tolerance and other functional tests, and, 4, kind of lesion.

Symptoms.—Patients presenting dyspnea on ordinary effort, persistent cough due to chronic pulmonary congestion, attacks of acute pulmonary edema—often wrongly called cardiac asthma—true anginal pain, or swelling of the feet, should in general avoid matrimony.

Physical signs.—Enlargement of the heart, either from dilatation of hypertrophy or both; rapid pulse rate at rest; evidence of a serious valvular defect, either insufficiency or stenosis; evidence of myocardial weakness, such as *pulsus alternans;* persistent arterial hypertension particularly a high diastolic pressure; these are the most important contraindications to be taken into account.

Functional tests.—These are notoriously inexact and subject to the play of a number of factors outside the myocardium. However, they have some value. Of these the simplest and probably the most reliable is the socalled exercise tolerance test. After an exercise which makes some demand on the individual, the pulse rate should not be unduly accelerated and should, within two minutes after completing the exercise, return almost or quite to the previous rate at rest. If the pulse rate remains rapid and if the shortness of breath is pronounced, a valuable hint is given that the condition of the myocardium is unsatisfactory. The exercises which may be used may vary from a hundred hops in a vigorous individual to a few flexions of the arms in one suspected of myocardial weakness. A very good standard exercise is raising a ten pound dumb-bell at arm's length above the head from ten to thirty times. The vital capacity varies, in general, inversely as the cardiac capacity, and has some value as a test for cardiac efficiency.

The kind of lesion.—Experience has shown that individuals with mitral stenosis bear labor less well than those having other valvular lesions. One should, therefore, hesitate to sanction marriage and pregnancy when there is evidence of great narrowing of the mitral valve, as shown by marked cyanosis, cough, shortness of breath on effort, and a diastolic presystolic murmur occupying the entire diastolic period. Patients with marked aortic insufficiency, especially when the pulse pressure is high and evidence of dilatation of the left ventricle is present, should not undertake increased burdens. Patients with mitral insufficiency with slight or moderate mitral stenosis without evidence of myocardial weakness can in general be favorably considered. Auricular fibrillation when it occurs before middle life is ordinarily a sequel of mitral stenosis or mitral insufficiency and should, as a rule, interdict matrimony. There are, however, exceptional cases of auricular fibrillation in which cardiac functional efficiency is satisfactory and in which this disturbance might be disregarded.

Decision in general must depend upon careful weighing of symptoms, physical signs, exercise tolerance, and the diagnosis of the individual lesion.

PREGNANCY AND HEART DISEASE.

It is important for the medical man to recognize the general truth of the dictum, "Women with chronic cardiac disease bear matrimony and pregnancy well." The practitioner should therefore be very sure of his ground before advising adversely in the question of marriage and pregnancy, and the factors enumerated above on marriage and heart disease should be taken into account. In the event of pregnancy occurring in the woman with chronic heart disease, it should be remembered that in the average case pregnancy and labor will proceed with little difficulty and that it is only in the exceptional case a serious situation arises. Nothing is more unfair than to raise an alarm or advise immediate termination of pregnancy just because a heart lesion is discovered. Most patients can be kept from a cardiac breakdown and brought to term and to delivery with entire safety.

The first endeavor of the physician should be to prevent cardiac decompensation during pregnancy. This can usually be done by recognition of the heart lesion early in pregnancy, by frequent observation, and by prompt treatment at the earliest sign of decompensation. So soon as the pregnant cardiac patient shows unusual shortness of breath, cyanosis, weakness, or edema, she should be kept at rest, either in bed or in a chair and treated, not as a pregnant woman, but as a case of decompensated heart disease. In general, in such a case the patient should have a limited allowance of fluid, enough digitalis to give satisfactory physiological action, diuretics and sedatives as indicated. Upon such a regimen intelligently carried out compensation is usually restored and the patient can continue the pregnancy under careful supervision. During pregnancy the cardiac patient may require frequent periods of treatment of the kind outlined in order to preserve the balance of the circulation and ward off decompensation. If decompensation occurs early in pregnancy, before the fourth month, and without special strain to cause it, it is usually unwise to continue the pregnancy. If decompensation occurs after the fourth month and responds well to treatment, it is in general safe to allow the patient to proceed with the pregnancy if she has expert oversight. If at any stage of the pregnancy the compensation is not at least partially restored by treatment, necessity for action is at once apparent.

In general, one should not take any measure to deliver a patient with decompensation until medical treatment has been tried. The double burden of decompensation and *accouchement forcé* is one which is badly borne. Most of the deaths reported in pregnancy with heart disease are due to unwise interference when serious decompensation exists. If a certain measure of compensation is restored by medical measures a satisfactory outcome of an induced labor is much more likely to occur.

If a serious cardiac breakdown can be averted by medical treatment, it is usually wiser to allow the cardiac patient to go on to term than to accelerate delivery by interference. In most cardiac cases the patients will go through labor normally with little difficulty. It is important that the heart be under control of digitalis at the time of labor and that all possible strain be avoided. The first stage of labor places no great burden on the circulation. It is the second stage with its play of the voluntary muscles and the entire mechanism of expulsion that is a severe strain to the compromised heart. This second stage, therefore, should be made as short and as easy as possible by appropriate obstetrical methods. If anesthesia is required, ether is probably the most satisfactory, as it is borne very well by cardiac patients. If obstetrical conditions do not promise a normal labor, Cæsarean section may be considered. This is rarely necessary but is borne well by the cardiac patient. In experienced hands it is preferable to a prolonged labor from a narrow pelvis or other obstetrical obstacle. It is often preferable to *accouchement forcé* in advance of term.

The question of sterilization of the cardiac patient is not unimportant. If pregnancy and labor have been a severe strain to the heart and any degree of decompensation has occurred this operation is to be looked upon with favor. One advantage of delivery by Cæsarean section is the opportunity this furnishes to render the patient immune from further childbearing.

All danger is not at end with the delivery of the child. Acute cardiac decompensation may occur immediately after delivery or may be delayed several days. In patients with mitral stenosis, acute pulmonary edema is prone to occur after delivery. The patient must be kept very quiet. If acute pulmonary edema should occur during delivery, the loss of considerable blood from the uterus should be encouraged; if, at a later time, prompt venesection, providing the patient is not anemic, is effective. Morphine and digitalis, as indicated, should also be used. The exercise tolerance test may be used as a rough means to govern the amount of activity allowed the convalescing patient. If the response to effort is satisfactory, the patient may be allowed out of bed and may gradually resume such pursuits as are within the capacity of the heart.

THE PERMANENT EFFECT OF PREGNANCY ON A DISEASED HEART.

In patients who have been carefully supervised and prevented from serious cardiac breakdown during pregnancy, there should be little or no decline in cardiac reserve power as the result of the performance of this function. Three or four months after delivery in many of these cases no decline in exercise tolerance can be made out. On general principles, however, it is unwise to subject the woman with serious heart disease to the strain of repeated pregnancies. If the patient has one or more healthy children, the question of sterilization is one to be considered seriously. Aware of the tendency of ordinary heart disease to become more serious as time goes on, the matter of sterilization with these patients is one of great importance. One of the reasons for advising Cæsarean section in selected cases is the ease with which sterilization can be accomplished at that operation.

SUMMARY.

The important points in the management of pregnancy and heart disease may be summarized.

1. Careful antenatal supervision is imperative.
2. All patients showing signs of decompensation at any period of pregnancy should have medical treatment, preferably in a hospital.
3. The response to medical treatment of the average case of chronic valvular disease of the heart in pregnancy is satisfactory and the same principles govern the treatment as govern the treatment of such cases not associated with pregnancy.
4. Induction of labor should never be attempted in case of a decompensated heart until thorough trial has been made of medical measures. Disregard of this rule has often led to disaster.
5. Hard and fast rules to govern the decision to terminate pregnancy in heart disease cannot be set down. In general, if decompensation occurs early in pregnancy, if it does not respond to medical treatment, if it has been severe despite proper care in previous pregnancies and if the signs and symptoms indicate serious circulatory defect despite treatment, termination is usually wise.
6. The question of the method by which pregnancy should be ended is largely an obstetrical one, the point of greatest importance being the guarantee of a short and easy second stage. It should be remembered that if serious cardiac breakdown can be averted, it is wiser not to attempt delivery in advance of term. Cæsarean section is rarely necessary. Sterilization should come up for consideration in appropriate cases.

A Clinical Study of Quinidine in Auricular Fibrillation*

By DAVID FELBERBAUM, M.D.,
and
OSCAR BRENNER, M.D.,
New York.

Auricular fibrillation is the most frequent arrhythmia seen clinically. It makes up about forty per cent. to fifty per cent. of all irregularities. Until Wenchenbach in 1914 observed the remarkable effect of quinine in arresting the fibrillation of the auricles in two cases, and restoring the normal rhythm, digitalis was our only standby. But digitalis does not alter the abnormal mechanism. It merely blocks many of the rapid and irregular impulses bombarding the ventricles, thus causing them to beat at a slower and more efficient rate.

Experiments (1) upon animals have established that fibrillation of the auricles diminishes the output of the heart by forty per cent. and although clinically this deficiency may be remedied by the wonderful adaptability of the heart muscles and certainly materially so by the judicious use of digitalis, nevertheless the irregularity of itself, even under the best conditions, embarrasses the functional efficiency of the heart and the least provocation will cause failure of compensation, as the reserve force of these hearts are always curtailed.

It is therefore natural that a great deal of interest should be aroused by a remedy that will restore to a normal mechanism a fibrillating heart, and since Wenchenbach's original communication, many reports have appeared in the literature.

Frey (2) in 1918 systematically studied the various cinchona alkaloids in patients with this condition. He found that quinidine was most effective in this respect and least toxic. (Dextrorotary stereoisomer of quinine.) Quinidine sulphate is used because of its better solubility and quicker absorption. In his first communication Frey reported a series of ten cases in six of which he was able to revert the fibrillation back to the normal rhythm. Stimulated by Frey's remarkable results, many investigators studied the effect of quinidine sulphate, and up to the present date there has been recorded about five hundred cases, of which about fifty-one per cent. have been controlled by quinidine, at least temporarily.

PHARMACOLOGY.

The factors which determine the success or failure of the treatment are not as yet entirely understood. Pharmacological experiments on the action of quinine and quinidine on the heart have been done by Santesson (3), who, in 1893, showed that quinine and its alkaloids cause a retardation of the rate and a diminution of the force of the muscular contraction in the isolated frog's heart. Hoffman (4) in 1915 experimenting on dogs' and cats' hearts with perfusions of quinidine, demonstrated that the excitability of the auricular musculature was greatly diminished and that it required greater electrical shocks to produce contractions. Whereas, fibrillation could be easily induced by rhythmic induction shocks previous to the perfusion, it was impossible to do so after the perfusion. Boden and Newkirch (5) in 1920 studied the effects of perfusions of quinidine in isolated rabbits and human fetal hearts and obtained similar results.

In this connection the theory of the circus movement as the actual cause of fibrillatory mechanism is of great significance. In a series of recent articles Lewis (6) gives an ingenious explanation of the action of quinidine in restoring the normal rhythm by applying this theory. From experiments on animals he came to the conclusion that the refractory phase in the auricles is increased and thereby quinidine sets up barriers or local blocks in the ring in which the contraction wave is circulating. This blocking becomes so effectual in some cases that the normal sinoauricular node, which, in fibrillation of the auricles is submerged, can reassert itself and become the pacemaker of the heart. However, quinidine also increases the rate of conduction through the auricles. This tends towards continuing the circus movement, and it depends upon which of these two effects predominates, whether or not the circus movement will be abolished.

This theory is further strengthened by electrocardiographic studies of the action of quinidine in patients with fibrillation. The most noticeable feature is a conspicuous reduction of the rate at which the auricles beat, and in cases in which the treatment is successful, the progressive slowing of the auricular activity is abruptly brought to an end, the disordered action ceases, and the normal action is at once reestablished.

CLINICAL FACTORS INFLUENCING THE ACTION OF QUINIDINE.

Clinically, the type of valvular disease present has no effect as to the action of quinidine; neither does the age or sex influence it. Frey (2) and others comment on the fact that the duration of the fibrillatory state is the most important condition for success. The more recent the incident, the more likely the outcome will be successful. He says that cases in which the fibrillation followed recent trauma, operations or infectious diseases, as pneumonia, the results are prompt and lasting. Two thirds of the cases in which the fibrillation was present less than one year were restored to normal, while only four per cent. of those over one year, were affected by quinidine.

It is also essential to get the heart in as good a state of compensation as possible. The patient should be kept in bed, digitalized, and when compensation is fairly well restored, to discontinue digitalis for at least one week before beginning the course of quinidine.

ADMINISTRATION OF QUINIDINE.

The size of the doses of quinidine is of great importance. Jenny (8), who employed the largest doses, five tenths gm. at a dose, a total of two to three gms. a day, had the greatest percentage of success. In eighteen cases, seventeen or ninety-four per cent. were restored to the normal rhythm. On the other hand, Klevitz (9), who used very small doses, one tenth gm., had only one successful outcome in a series of thirteen cases, or only eight per cent. Most observers used the doses as originally employed by Frey namely, two tenths gm. This is given every two or three hours, as the drug is rapidly excreted.

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*From the Medical Department, Montefiore Hospital, New York City.

In our series we first gave two preliminary doses—six hours apart—to guard against any untoward symptoms. If the patient stood the drug nicely, the next day two tenths gm. was continued every three hours for five doses daily. If, in three or four days, no effect was obtained, the dose was doubled and continued for a week or ten days longer, at the end of which time, if no results were obtained, the case was considered refractory. In a few of these another attempt was made a few weeks later, but we never succeeded when the case was refractory at first trial.

This report comprises a study of eighteen unselected cases and the results obtained are of interest in illustrating the alterations in the heart's action induced by the administration of quinidine, and the various toxic effects observed in these cases, as shown by subjective symptoms and the changes in the form of the electrocardiograms which may be ascribed to toxic effect on the heart muscle. The cases studied are divided into three groups: 1. Those cases in which the normal mechanism was reestablished. 2. Those in which the drug failed. 3. Those in which toxic effects were seen. A complete summary of all these findings is given in Table I.

CASES IN WHICH NORMAL MECHANISM WAS RESTORED.

In this group there were nine cases. The known duration of fibrillation in these cases vary from a few months to eight years. The amount of quinidine necessary to restore the normal mechanism varied from 0.4 gm. to 4.8 gms. The duration of the restored rhythm varied from three hours to eleven months. Five of these cases were in a state of decompensation when quinidine was first given, but no bad effects were observed. The type of valvular disease had no effect on the action of quinidine, neither did the age nor the sex influence the result. The duration of the fibrillation in all the cases restored was over one year. In one case eight years.

The change from the abnormal to the normal rhythm is sudden. Some patients were distinctly aware of the transition and asserted that they felt immediately better, the palpitation having been relieved. Others did not appreciate the difference. Frey notes that in sixty-six per cent. of his cases the effect lasted less than one month. In our series all but one case lasted less than two months. The longest duration of the restored rhythm so far reported are two cases by Boch (10), of one year's duration. The longest period maintained in our cases was eleven months. (Case I.)

In some of the patients that relapsed the effect was repeatedly reduplicated. In one, nine relapses were restored with from eight tenths to one gm. of quinidine. (Case VII.) Another has been restored twice.

Cases	Age	Sex	Etiology	Valvular Lesions: Mitral	Valvular Lesions: Aortic	Valvular Lesions: Combined	Card. Enlargement	Known Duration of Fibrillation	Rhythm Restored	Amount Necessary for Restoration	Total Amount Administered	Duration of Admin. Days	Duration of Rest Rhythm	Symptoms Complained: Precordial Pains	Palpitation	Headache	Dyspnea	Tachycardia	Vertigo	Nausea and Vomiting	Abdominal Pain	Deep cyanosis	Flushing	Remarks
1.	45	F	Rheum.			+	+	2 yr.	+	2.3	7.1	9	11 mo.										+	Six mos. before admission emboli in medulla, causing cruciate hemiplegia ventricular extrasystole.
2.	49	M	Rheum.			+	+	1 yr.	+	4.8	19.3	25	48 hr.	+				+			+			Flutter for eleven days Heart enlarged further decompensation increased.
3.	55	F	Rheum.	+				2 dy.	+	2.0	7.1	5	24 hr.			+				+			+	Left hospital. "T" variations.
4.	39	F	Rheum.	+			+	1 yr.	+	2.5	4.8	4	4 dy.				+			+				Restored twice, 7.8 gm. no effect on fibrillation on second relapse. Third attempt restored for three days after 6.7 gm.
5.	50	F	Art.Scl.	+				1 yr.	+		2.2	3	3 hr.	+	+		+	+						Vent. tachycardia resulted after two trials. "P. R." interval increased.
6.	38	M	Rheum.	+			+	8 yr.	+	1.5	8.	6	12 hr.	+	+	+	+	+	+					Nine relapses restored with .4 to 4.0 gm. "T" variations.
7.	37	F	Rheum.	+			+	4 yr.	+	.4	.4	1	2 mo.											
8.	54	F	Art.Scl.	+			+	6 mo.	—		11.2	13			+								+	Ventricular tachycardia.
9.	50	M	Rheum.	+			+	1 yr.	—		13.8	15			+	+	+							
10.	55	F	Art.Scl.	+		+	+	8 mo.	+	3.	4.1	9	24 hr.											
11.	55	F	Rheum.	+			+	1 yr.	—		5.7	6												
12.	14	F	Rheum.	+			+	6 mo.	—		6.0			+		+	+							
13.	30	F	Rheum.	+			+	1 yr.	+	1.2	6.8	19	12 hr.	+		+	+							Normal mechanism restored for twelve hours on second attempt.
14.	19	F	Rheum.	+			+	7 yr.	—		4.8	5		+		+		+			+			Two attempts 4.2 gm. given, no effect.
15.	18	F	Rheum.	+			+	2 yr.	—		4.8	5		+				+						Rhythm restored once at another hospital with quinidine lasting 24 hours. Present attempt increased edema, etc.
16.	36	F	Rheum.	+			+	3 yr.	—		0.2	1			+		+	+				+		Following first dose of .2 gms. marked cyanosis and dyspnea, refused further treatment.
17.	38	M	Rheum.				+	2 yr.	—		9.0	7			+		+			+				Compensation broke down, liver enlarged, râles in chest. Two weeks' rest and digitalis restored compensation.
18.	38	F	Rheum.		+		+	2 mo.	—		0.4	1			+	+			+					Refused further treatment after second dose because of distress.

(Case IV.) But sooner or later these become refractory to the drug, so that in only a small percentage is a prolonged effect possible. The reason for this is that the underlying cause which originally precipitates the fibrillation is not removed by quinidine, it merely arrests the disordered mechanism, the tendency toward fibrillation remains in nearly all the cases.

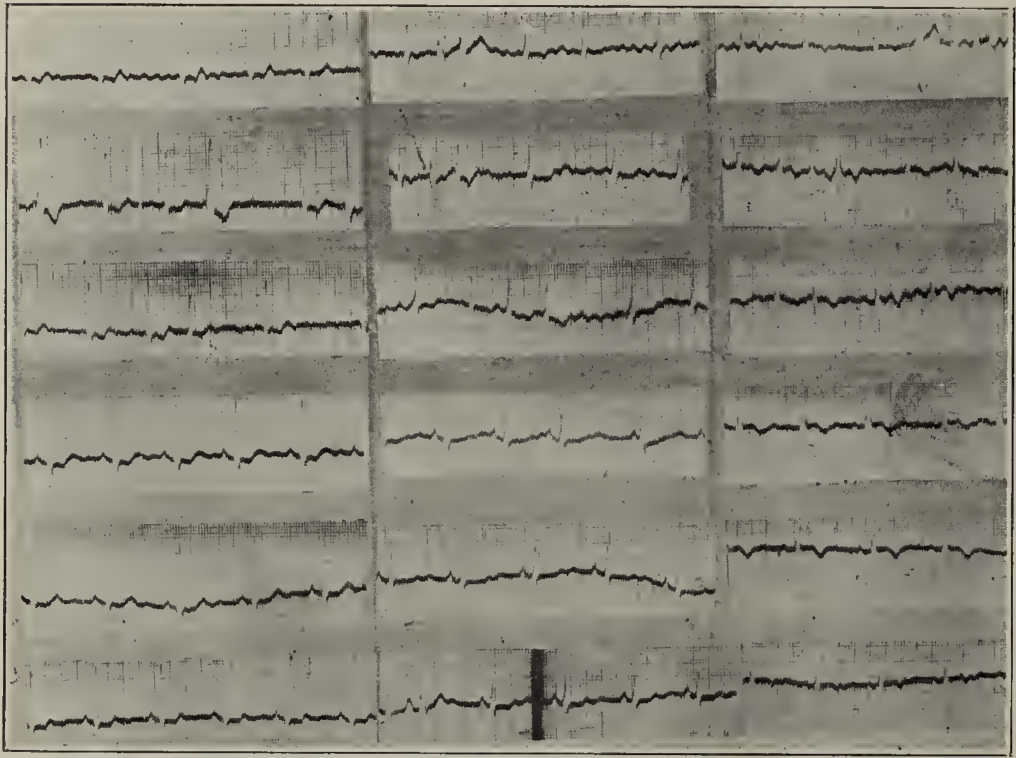

FIG. 1.—Shows restoration of normal mechanism occasional extrasystole and variations in the "T" wave.

The effect on compensation varies. Some cases are much improved, the clinical signs of decompensation disappear. In others practically no beneficial effect is seen. This depends entirely on the condition of the myocardium. If it be badly diseased and the cardiac reserve is low, correcting the abnormal rhythm cannot improve the efficiency of the heart. Furthermore, compensation may be greatly diminished by the tachycardia induced by quinidine, either the simple tachycardia alone or the more serious auricular flutter and ventricular tachycardia occasionally seen following quinidine administration.

It would seem reasonable to assume that with the restoration of the normal mechanism cardiac enlargement would show material change. That is, become smaller; because the circulation is carried out in a more efficient manner. We have made studies by means of teleoröntgenograms of nine cases in which quinidine was employed.

In five of these the rhythm was restored and teleoröntgenograms were made before and after the change in the mechanism of the heart beat. In one case (Case III) there was a definite diminution of the heart, but in this case the fibrillation had come on a few hours previously and was promptly restored by quinidine. In Case II there was a definite enlargement in the size of the heart found in the teleoröntgenogram taken during the relapse from the effect of quinidine. It was not possible, in this case, to restore the rhythm a second time; on the contrary, quinidine produced a state of constant flutter during the eleven days of its use. The heart failure became progressively worse and the enlargement was made out during this time. In all the other cases no change in the size of the heart was evident. It is therefore apparent that the mere restoration of the rhythm does not affect the size of the heart, in the ordinary type of auricular fibrillation. On the other hand, it may decidedly enlarge the cardiac diameters due to the extreme rapidity and ineffectual cardiac contractions, causing exhaustion of the myocardium with its accompanying dilatation.

CASES IN WHICH QUINIDINE WAS UNSUCCESSFUL.

In nine cases it was found impossible to restore the rhythm, the total amount of drug used varied from 4 to 13.8 gms., and was continued from five to eighteen days. In some cases the single doses were doubled. It is seen from analyses of these cases that the patients complain more of the subjective untoward symptoms than the previous group. They frequently require prolonged treatment with digitalis and rest in bed following the administration of quinidine, before the circulation is restored to its previous condition.

UNTOWARD EFFECTS.

In our series no fatalities occurred. However, alarming symptoms may arise, such as deep cyanosis, severe dyspnea and cessation of respiration. In only one patient was cyanosis produced and this occurred with the second trial dose. It promptly disappeared with the discontinuance of the drug. (Case XVI.) Usually the patients complain of palpitation, slight dyspnea and tachycardia. Headache, vertigo, occasional abdominal pains and vomiting was seen in our series. Curiously, none of our patients showed any

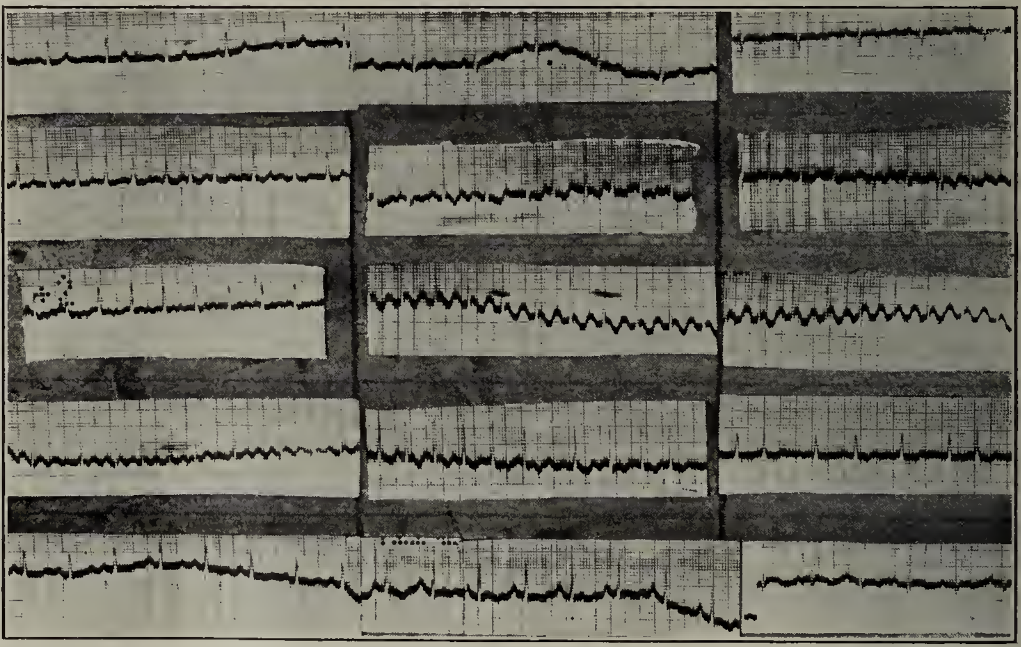

FIG. 2.—Shows restoration of normal mechanism on two occasions, demonstrating the slowing of the auricular complexes and transitory auricular flutter.

symptoms of cinchonism. Fatalities have been recorded by Benjamin and Kapf (11) (two cases), Bergmann (12) (one case), Hewlett and Sweeney (13) (two cases), Hay (14), (one case). But in only three of these could the fatality be ascribed directly to the drug, as most of the patients were in poor condition before the drug was employed. Death in these cases usually occurred suddenly within twenty-four hours after the normal rhythm was reestablished. Another possible danger is the breaking up of an auricular thrombus and disseminating emboli throughout the circulation. Frey, Ellis and Clark-Kennedy (15) and Levy (16) report such occurrences. In this connection it is interesting to note the histories of two patients which we observed, in whom previous to the use of quinidine and while the auricles were in a state of fibrillation, cerebral emboli had occurred. Both of these reacted promptly to quinidine without any embolic phenomena.

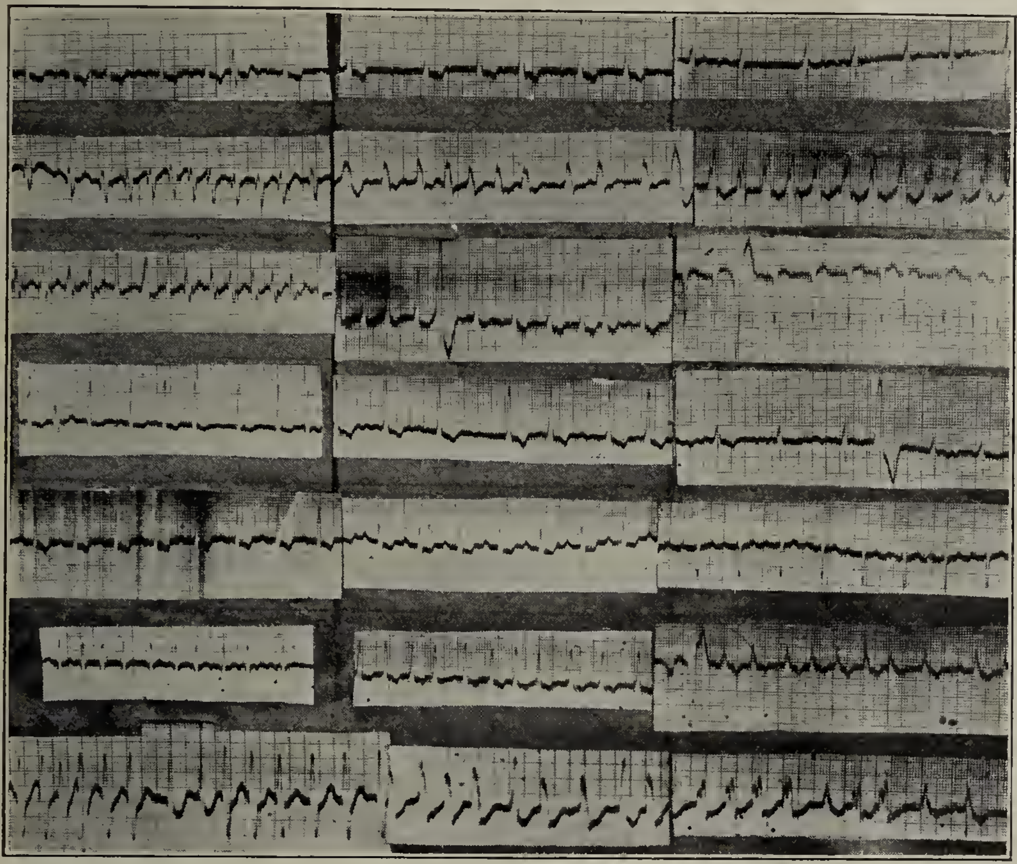

Fig. 3.—Demonstrates prolonged paroxysm of ventricular tachycardia, showing the abnormal complexes which were produced on two separate administrations of quinidine. June 17, 1921, mechanism became normal with a prolonged "PR" interval.

Case I.—Female, aged forty-five, admitted August 2, 1921, diagnosis, chronic cardiac valvular disease involving both mitral and aortic valves. The known duration of fibrillation was two years. Three months before admission she had an embolus in the bulb cerebri, causing a cruciate hemiplegia. (Right face and arm and left leg.) The first dose of quinidine was given on October 26, 1921. On October 28th, after 2.3 gms. had been taken, the mechanism of the heart beat became normal. There were no untoward symptoms and the mechanism had been normal ever since. That is, eleven months. The patient is comfortable and able to get about. (Fig. 1.)

Case II.—Female, aged thirty-nine, diagnosis, rheumatic cardiac valvular disease, mitral stenosis and regurgitation. The known duration of fibrillation was one year, the cardiac disease dated back twelve years. Admitted August 13, 1921.

Seven months before admission there suddenly developed a right hemiplegia with a motor aphasia. This patient was given quinidine sulphate on four different occasions, the normal rhythm being restored twice. There were no untoward symptoms on either occasion. The patient died November 7, 1922. Autopsy revealed a large mural thrombus in left auricle and recent multiple emboli in lungs and kidneys.

ELECTROCARDIOGRAPHIC CHANGES.

Various changes in the electrocardiograms have been reported, the most common observation being a slowing of the auricular deflections, while the ventricular rate increases. This slowing of the auricular complexes gradually becomes more marked and passes into a state of flutter. When frequent electrocardiographic records are made these changes are invariably seen in cases in which the mechanism is restored. (Fig. 2.)

Other changes were occasional increase in the auricular ventricular conduction time. This was noted once in our series (Case V) (Fig. 3). Various changes in the form of the T wave were seen, such as inversion, bifid character and constant variation in the height. Three cases showed such changes. The meaning of these changes is not known; possibly they are minor toxic effects of the quinidine upon the ventricles.

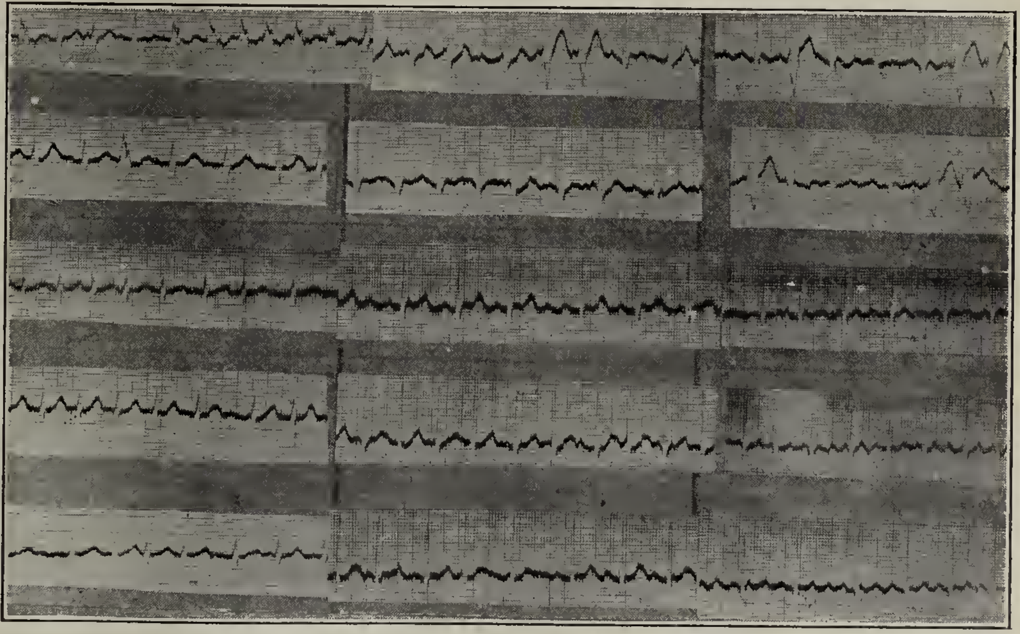

Fig. 4.—Shows the production of runs of ventricular extrasystoles gradually disappearing with the discontinuance of quinidine.

A more common disturbance seen are extrasystoles both auricular and ventricular, occasional runs of extrasystoles were seen (Fig. 4), but the most interesting change of all is the production of a paroxysmal ventricular tachycardia. This was seen in two cases, in one of which it was reproduced during a second trial (Fig. 3). It is possible that some of the fatalities reported in the literature were caused by such paroxysm passing into a state of ventricular fibrillation. It is absolutely essential that quinidine should be discontinued as soon as frequent ventricular extrasystoles are recorded in the electrocardiograms, especially if these tend to run in series.

SUMMARY.

1. Quinidine arrests auricular fibrillation and restores the normal rhythm in about fifty per cent. of unselected cases. The effect is temporary in the majority and only in a small percentage will the result be lasting.

2. There are certain dangers to bear in mind in the administration of quinidine, namely, the possibility of disseminating emboli through the circulation, and certain toxic effects on the ventricles which may possibly lead to a fatal termination.

3. The use of the drug is still in an experimental stage and should only be used in institutions where careful electrocardiographic examinations are possible.

The author's references will appear in his reprints.

The Control of Paroxysmal Tachycardia by Quinidine Sulphate*

By C. C. WOLFERTH, M.D.,
Philadelphia.

It has been shown by the work of Santesson (1), Hofmann (2), Boden and Neukirch (3), Schott (4) and others that the effects of quinidine on the normal heart are in the main depression of the various functions of cardiac muscle. It is generally agreed that conductivity in the specialized conduction paths, excitability and contractility are sharply depressed. The evidence as to the effect on stimulus production is not so clear. Some workers have found that quinidine slows the rate of the heart, but others have failed to obtain this effect.

Lewis and his coworkers (5) have recently stated that the refractory period of heart muscle is increased by quinidine and conduction of the excitation wave through nonspecialized muscle is slowed. To the increase in refractory period they attribute the well known effect of quinidine in terminating auricular fibrillation and flutter. The retardation of the excitation wave, on the other hand, tends to help preserve the abnormal rhythm. The result of treatment in any given case, they believe, depends on which of these effects is predominant.

The cause of paroxysmal tachycardia is not definitely known but it is believed that increased excitability in some ectopic focus is a factor in its production. Since quinidine has been shown experimentally to have a marked effect in depressing excitability, it is reasonable to expect that the drug might exert a favorable influence in preventing or terminating attacks of paroxysmal tachycardia.

Boden and Neukirch (3) have reported briefly their experiences in giving quinidine by intravenous injection during attacks of paroxysmal tachycardia. In six cases studied, the attacks were abruptly terminated in four and the rate slowed in two. Romberg (6) has also been successful in terminating attacks with quinidine. Haass (7) treated two cases without result. Whether he tried to terminate attacks or prevent their occurrence is not stated. Romberg has expressed the view that quinidine might be found of value in preventing the onset of attacks in cases in which they are numerous. Thus far there have been no reports bearing on this point. This is probably due to the comparative rarity of cases in which attacks occur so frequently and constantly that conclusions can be drawn confidently as to the effect of treatment. Recently, a woman with paroxysmal auricular tachycardia came under observation in the medical division of the University Hospital. Her attacks occurred day after day with such frequency that the case was regarded as an exceptionally favorable one in which to note the effect of quinidine.

REPORT OF CASE.

CASE I.—G. G. G., a white woman, forty-seven years old, applied for treatment at the medical dispensary of the University Hospital, complaining of attacks of palpitation. Ever since an attack of influenza in April, 1919, she had suffered from paroxysmal attacks of rapid and forcible heart action accompanied by shortness of breath, a smothering sensation, faintness, dimness of vision, and precordial pain. At first the attacks came only occasionally, but during the past three months they had been much more frequent. They occurred most often when she exerted herself, also when she was sitting quietly, but never when she was lying down. She had suffered a great deal from backache since the birth of a child twenty-eight years ago. For six months she had had a dull throbbing pain in her hips, worse on walking and on lying on either side. She could not sleep unless she lay on her back, consequently her sleep was disturbed. At the time the hips began to cause trouble, the ring finger of her right hand became swollen and painful. Her appetite was good but sometimes she had a sour stomach and regurgitation, which, however, responded readily to sodium bicarbonate. Her weight was 240 pounds, which was the most she had ever weighed.

She had ,had pleurisy at the age of fifteen and typhoid fever at twenty-four, and repeated attacks of tonsillitis. In 1902 a bilateral oophorectomy was done which brought on an artificial menopause. The year after this operation her weight increased from 130 to 200 pounds and since that time she had gradually gained forty pounds. In 1908 two operations were performed for adhesions and bladder trouble. In 1911 she was operated on for incisional hernia. She was a housewife and had always worked hard. She ate unusually large amounts but otherwise her habits were good. Her first husband was killed in an accident. Her second husband and a daughter, her only child, were living and well. There had been no miscarriages. The family history was unimportant.

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*From the Medical Division, University Hospital, and the William Pepper Clinical Laboratory, University of Pennsylvania.

Physical examination showed a woman, short, very fat, who looked about her stated age, forty-seven years. Between attacks she was placid but during the attacks she was somewhat apprehensive, although there were no external evidences of great discomfort. She was able to note accurately the beginning and ending of attacks, apparently never making a mistake in this respect. There was no cyanosis nor evident shortness of breath as she sat quietly. A few fine, moist râles were heard at the bases of both lungs which quickly disappeared after a few deep breaths. The cardiac apex impulse was situated in the fifth interspace with its outer border twelve cm. to the left of the midsternal line. By percussion, the cardiac area extended three cm. to the right and twelve cm. to the left of the midline. There was reduplication of the first sound at the apex but no murmur nor accentuation of sounds. For periods of several minutes the rate might be 60 to 70 a minute and regular, except for occasional premature contractions. Suddenly there was an onset of regular or slightly irregular rapid rate varying from 165 to 180 a minute in different attacks. The pulse which previously had been of good quality became small and soft and there were marked pulsations in the vessels of the neck. The attacks lasted from thirty seconds to several minutes and stopped as abruptly as they began. The abdomen was fat and pendulous and there was a long operation scar extending from the ensiform to the symphysis pubis. There was a small incisional hernia in the lower part of the scar. The liver was not palpable, nor demonstrably enlarged. There was swelling, redness, and tenderness of the first interphalangeal joint of the right hand, moderate varicosities of the veins of the legs, slight pitting on pressure about the ankles, and extreme flat feet. The reflexes were normal and the blood pressure 160/105.

The laboratory examinations showed that the urine contained traces of albumin and a few hyaline and light granular casts; otherwise negative. The blood count was entirely normal. The Wassermann was reported medium positive. The phthalein excretion was fifty per cent. in two hours, and the blood urea nitrogen was ten mgm. to one hundred c. c. Teleröntgenogram of the heart showed it to be definitely enlarged with a transverse measurement of 19.5 cm. X ray studies of the swollen finger and the sinuses were negative. The electrocardiograms showed the rapid heart action to be due to paroxysmal auricular tachycardia (Fig. 1). The irregularity in some of the attacks was caused by associated partial block with occasional dropping of ventricular beats (Fig. 2).

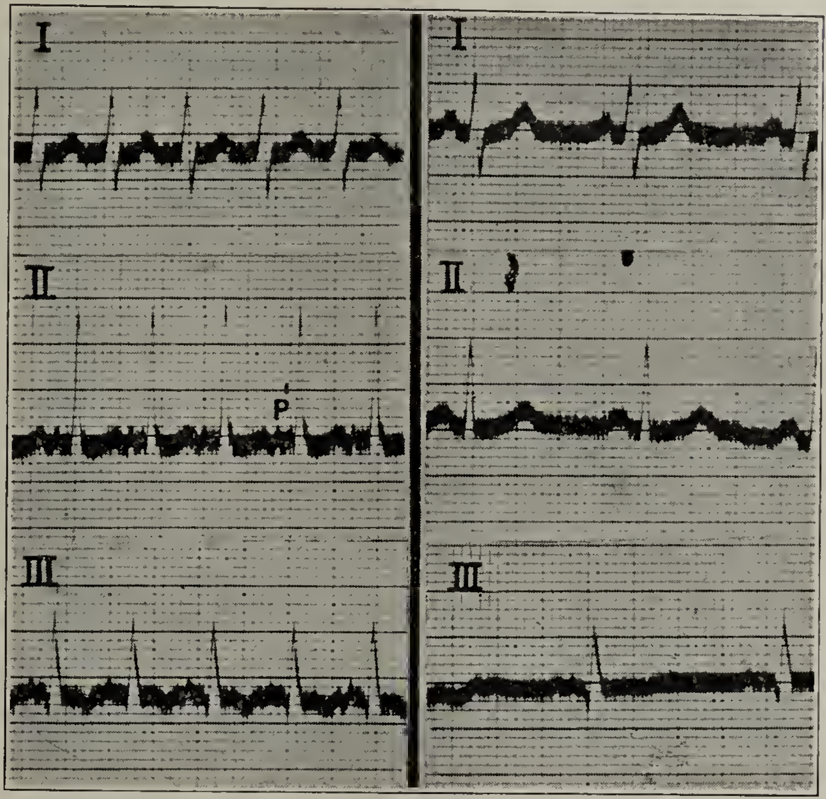

Fig. 1.—The tracing on the right shows a paroxysm of auricular tachycardia with a rate of 171. The ventricular action is regular. The tracing on the left was taken immediately afterward. The rate varies between 71 and 83.

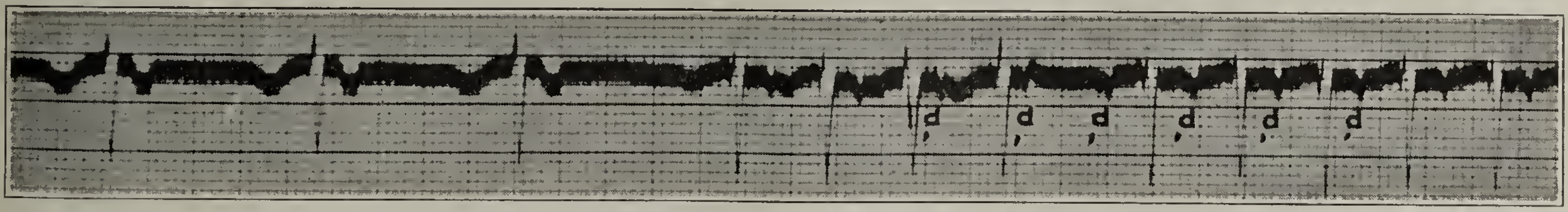

Fig. 2.—The end of a paroxysm of tachycardia. Regular auricular tachycardia but irregular ventricular action due to partial auriculo-ventricular block. No evidence of disturbed conduction after the mechanism returned to normal.

Between November 9th and 25th, the patient visited the medical dispensary three times. No drug treatment was given except some salicylates for the pain in the joints. She was advised to stop working and remain as quiet as possible. The attacks increased in frequency so that by her third visit the intervals between them were very short except when she was in a recumbent position. She was then referred to the ward for treatment. She was admitted to the ward on November 25th and immediately placed on a régime of restricted diet and rest in bed most of the day. At first she was allowed up about three hours a day. The question of the possible cause of the joint pains and the attacks of paroxysmal tachycardia was again considered. On account of the frequent attacks of tonsillitis, the tonsils came under suspicion, although they were very small and innocent looking. Because of the report of a medium positive Wassermann, it was thought that there might be a syphilitic myocarditis. On November 26th she was given two doses of quinidine sulphate, 0.2 gram. The next day the amount was increased to 0.4 gram three times a day and the number of attacks decreased. On November 29th the dose was further increased to 0.6 gram three times a day and only one attack occurred all day. The next three days 1.0 gram three times a day was given and there were no attacks. On December 3rd the dose was reduced to 0.4 gram three times a day and there were several attacks. From then on, during the remainder of her stay in the hospital, a period of two weeks, 0.8 gram three times a day was given. During the first four days of this dosage, there were two slight attacks, but in the next ten days, no attacks at all were noted by the patient and none discovered upon examination. During this time, her activity was gradually increased until she was up and about the ward all day. On December 5th mercurial inunctions were instituted but they were so badly borne that only four were given.

She was discharged from the hospital on December 18th. In view of her tolerance of quinidine and the improvement in physical strength and the abolition of the train of cardiac symptoms while in the ward, it was considered justifiable to permit her to continue taking the same amount of the drug after leaving. There were no further attacks until December 27th when she noticed three. On that day she had failed to take her medicine. She was then advised to take 0.4 gram four times a day, which she did for several days but had a few attacks during this time. The dose was then increased to 0.4 gram five times a day. On January 13th, the dose was again cut to 0.4 gram four times a day, which up to February 13th was enough to prevent the paroxysms. Whenever the dose was cut below this amount, attacks recurred. There had been a steady improvement in her tolerance to exertion so that she was able to do her work without difficulty.

Electrocardiograms taken on a number of occasions showed no depression of auriculoventricular conduction and no changes in the ventricular complexes except slightly less amplitude of the T wave in Leads I and II.

In attempting to judge the effect of quinidine in controlling the attacks of paroxysmal tachycardia in this case, the factors of rest and altered diet must be taken into consideration. It might be argued that the control of attacks following the patient's admission to the hospital could be ascribed, at least in part, to the restricted diet and the low plane of physical activity. This would not, however, explain the recurrence of attacks when the dose of quinidine was reduced nor their control when it was again increased, an experience which was repeated many times. The facts seem to demonstrate that quinidine was the important factor in controlling the attacks.

The amounts of the drug tolerated by this patient over long periods of time are unusual but this may be accounted for in part by her great weight. Nevertheless, judging from our own experiences and from the published reports, corresponding doses, calculated according to body weight, might be expected to bring on, in many patients, definite symptoms of depressed cardiac action. But in view of the marked clinical improvement in this patient, it seems reasonable to assume that whatever depression of contractility may have been caused by the drug was more than compensated for by the increased cardiac efficiency produced by undisturbed normal cardiac mechanism.

The effect of the drug in preventing attacks was found to be transient, distinctly less than twenty-four hours. Consequently, administration in divided doses every day seems to be the proper method in this type of case. It was hoped that suppression of the attacks might result in recovery of the heart muscle to such an extent that their spontaneous occurrence might be greatly reduced or abolished. Thus far, there seems to be no evidence that this has been accomplished.

Obviously, this form of treatment is not to be recommended unreservedly in the treatment of paroxysmal tachycardia. The administration of quinidine is apparently not without danger even in patients with comparatively healthy hearts. But the results observed in the case reported would seem to warrant further study of patients in whom the ordinary methods of managing paroxysmal tachycardia are ineffective and the attacks are so numerous that the capacity of the heart to carry on its work is seriously threatened.

A case of paroxysmal tachycardia is reported in which the attacks were extremely numerous and of short duration.

A definite influence on the frequency of attacks was exerted by quinidine sulphate; by administering sufficient amounts of the drug, the attacks could be completely suppressed.

The author's references will appear in his reprints.

Myocardial Degenerations and Their Treatment

By ALBERT E. ROUSSEL, M.D., O.A., F.A.C.P.,
Philadelphia,

Professor of Medicine, Graduate School of Medicine, University of Pennsylvania; Visiting Physician to the Polyclinic Hospital, etc.

In a previous communication, published in 1905, I pointed out that, contrary to general opinion, diseases of the myocardium were more frequent than those of the endocardium, and quoted the statistics of Schott that the proportion was 505 to 245. More recent observations, based largely on postmortem examinations, prove conclusively the truth of these observations, which is not sufficiently appreciated by the profession. This does not include the myocardial changes secondary to valvular lesions, which again are, in the majority of these instances, the actual cause of death.

It is fortunate that a better appreciation of these facts, together with the additional aids to diagnosis afforded by the fluoroscope, orthodiagram by x ray methods, the electrocardiogram, the sphygmomanometer, the polygraph, when a plebogram, a cardiogram and a sphygmogram are to be taken at the same time, results in the more general as well as earlier recognition of these important conditions.

Most infections, including the focal type, various toxemias, acute and chronic, some dyscrasias, anemia, various intoxications, thromboses, and emboli, if of a certain degree of intensity, produce changes in the heart muscle which may be acute or chronic, temporary or permanent.

Albuminous degeneration—one of the early changes—is a condition met with in infectious diseases, diphtheria, smallpox, typhoid, typhus, remittent fever, tuberculosis, lobar pneumonia, erysipelas, influenza, measles, septic processes, gonorrhea, and even a comparatively slight attack of tonsillitis. It is probable that in addition to the toxins generated, in many of these instances where continued fever is present this may also be a factor. This form of degeneration is characterized by a pale, turbid condition involving in most instances the entire cardiac muscle and relaxed, soft, brittle walls. In the acute form suppuration may result, or it may resolve into the chronic form.

Arteriosclerosis must be accepted as an important factor in many, but not in all cases, of cardiac degeneration. It is worthy of remembrance that at least partial occlusion of the coronary arteries due to this cause may be compensated through the vessels of Thebesius with avoidance of otherwise resulting damage. Much more often, however, as a result of the diminished blood supply, the parts undergo an anemic necrosis with resulting change in the muscular fibres either in loss of their nuclei or, as shown by J. Renaut (1889), fragmentation or fracture of the fibre itself. Some of these cases may be postmortem phenomena. If the development is a more gradual one the muscle fibres which have undergone this anemic necrosis are replaced by fibrous tissue with resulting increase in the size of the heart and subsequent gradual or sudden dilatation of its walls.

An important point to be remembered is that one of the most common causes of sudden death is due either to sudden obliteration by a thrombus of one coronary artery which has been narrowed by arteriosclerosis or endarteritis.

Myocardial degeneration secondary to hypertrophy and dilatation, the result of overstrain in athletics, is far more common than is admitted, and when the heart is called upon for reserve force in an acute illness it is often found wanting. I cannot refrain from quoting from an address I delivered before the Philadelphia College of Pharmacy in 1895:

"You cannot have failed to note the short duration of life of many athletes. Any acute disease, such as pneumonia, typhoid fever, and others, that during its course calls upon the heart for extra reserve force, even when no apparent cardiac disease exists, is particularly to be dreaded in this class of cases, and for my own part I would much prefer treating a case of pneumonia in an apparently scrawny, illdeveloped clerk who has never even handled a dumbbell, than in one of our overdeveloped athletic subjects." Recent observations on the socalled soldier's heart tend to confirm these statements.

The various tachycardias may sometimes result in cardiac changes, but not nearly so often or so pronounced as most authorities believe. I have at present under my care a neurotic young woman whose pulse rate has been between 100 and 130 for the past three years, with but very slight cardiac hypertrophy. Some years ago I began to believe that some of these cases were due to hyperthyroidism without the evidence of goitre or exophthalmos, and acting on this belief I had had three patients operated upon for the relief of the tachycardia by ligation. More recent experience with basal metabolism has confirmed this, but I now have them treated by intensive dose of x rays.

In the first case the result was a perfect cure after one year's duration; in the second there was marked amelioration, while in the third—the one alluded to above—the condition remained as before operation.

Necessarily, syphilis, rheumatism, gout, and occasionally diabetes, are the important etiological factors in this degenerative change. The first two diseases should give a positive history, but an important fact, which is not appreciated as much as it should be, is that true gouty subjects (rare in this country) are less likely to show myocardial change than those in whom the joints have never been inflamed, but who suffer from other irregular manifestations of the disease. This American gout, or lithemia, which is often difficult of recognition, is doubtless in many instances an explanation of those cases in which an apparent etiological factor could not be found. Recent observations would seem to prove that spinal fluid findings would be of value in cardiovascular diseases when syphilis is suspected and the blood Wassermann test is negative.

In rheumatism the nodules of Aschoff—a small collection of cells in the myocardium—are probably inflammatory, and it is interesting to note that they are more apt to be found in those cases which have presented evidences of subcutaneous rheumatic nodules.

The term fatty heart means fatty overgrowth with resulting fatty infiltration between the muscle fibres, and not infrequently resulting fatty degeneration. The first is an abnormal development of fat in or between the muscular substance of the heart, often impairing the contractile power, and not infrequently resulting in actual fatty degeneration. Hereditary predisposition exercises a marked influence on the occurrence of obesity, and no doubt also on resulting fatty infiltration. The condition is more than twice as common in the male as in the female, and is generally found after middle life. Improper food, sedentary habits, alcoholism, particularly in the consumption of malt liquors, are important factors.

Most of the cases of fatty heart are found in corpulent subjects and the simple reduction of weight in these cases is unfortunately not often accompanied by a corresponding improvement in the cardiac condition.

Fatty degeneration is a change in the muscular fibres, by which the transverse striæ disappear, being replaced by granules and globules of fat—a condition of defective nutrition, and therefore the result of various causes, old age perhaps, associated with fatty infiltration, anemia, either primary or secondary to repeated hemorrhages, or wasting diseases, phthisis, cancer, and chronic suppurating, prolonged fevers, chronic alterations of the blood, purpura, scurvy, hemorrhagic diathesis, certain poisons, phosphorus, arsenious acid, lead, antimony, and, last but not least, alcohol. Local causes, such as pericarditis and hypertrophied ventricular walls, as well as disease of the coronary arteries, may bring it about. The distribution of this change varies. When secondary to acute diseases it is generally uniform, but in the majority of all cases the left ventricle is more affected than the right.

A point of importance, as shown when we entertain the question of diagnosis of both of these conditions, is that the size of the heart may be normal or only slightly increased by the occurrence of secondary dilatation and occasionally it is diminished. This condition, however, may and often does occur in hearts previously enlarged.

Brown atrophy is a not common degenerative change, but may exist in that portion of the heart muscle near affected valves. In the old and those who have died from wasting diseases it may be present. I have seen several marked postmortem evidences of this kind in patients who have suffered repeated and profuse hemorrhages from uterine fibroids. In several other instances of a similar nature I have been so impressed by the physical signs and symptoms of a weak heart that I have enjoined particular caution in the administration of ether in those cases where operations were indicated.

Amyloid degeneration is rare and not often recognized macroscopically. Waxy and hyaline degeneration is often found in acute infections and toxic conditions. Myocarditis of rheumatism is a fibrositis or typical infiltration of tissue outside of muscle bundles.

The consequences of myocardial disease necessarily depend upon the degree and character of the affection, and to a certain extent upon the parts involved. In all cases, however, the result must be loss of contractile power and thus lead to imperfect filling of the arterial system and consequent visceral anemia. This, it is to be noted, is much more marked than is the correlative venous distention, which is so prominent an effect of dilatation of the heart.

In the fibroid heart, hypertrophy and dilatation usually coexist, and suggest at least recognition of the heart as the main issue involved. Dyspnea and dropsy are sooner or later present and the symptoms resemble those of dilatation of the heart. The first sound is weak and toneless and has been noticed to be weaker over the left than over the right ventricle when the former was more affected. A mitral systolic murmur may be present, but perhaps recognized only in the recumbent posture. The pulse is weak, irregular on exertion, normal frequency, or may be as infrequent as 30. The tension is as a rule high. Cardiac pain may be present, but rarely to a marked extent. In many instances, however, the symptoms have been remarkably latent and death may be sudden apart from rupture or even the existence of an aneurysm.

The recognition of a faint cardiac murmur is sometimes one of considerable difficulty. Ashner noted that in the most normal individuals pressure on the eyeball causes a slowing of the pulse rate up to ten beats to the minute through vagus inhibition, and Loeper and Moregeot, in December, 1913, noted the abolition of this reflex in tabes.

This cardiac inhibitory reflex may be considered as the bilateral group of cells in the medulla at the level of the nuclei of origin of the vagi, and when the tonic action constantly exerted through this centre is increased, cardiac inhibition results.

I have been much interested in this subject and for the past several years I have applied this method in the examination of all of my heart patients, and find that even in those cases where no apparent reduction in frequency is effected, and in a few cases where it is increased, in the majority of instances this pressure exercised for about two minutes will not only accentuate existing organic murmurs, sometimes to a marked degree, but will also bring out a previously unsuspected murmur. On the other hand, functional murmurs would seem to diminish in intensity or entirely disappear. The test is easily made and merits recognition.

Mackenzie speaks of physiological murmurs, particularly in younger subjects, occurring in apparently normal persons.

The diagnosis of many cases of fatty degeneration is to my mind even more difficult than that of a fibroid heart, and I am positive that often cases of this disease are not recognized even after a physical examination. This is due largely to the fact that as the size of the heart in simple, fatty degeneration may be little changed, the area of dullness may present no alteration on account of this slight dilatation that exists. It must be remembered, however, that in other cases fatty degeneration follows preexisting hypertrophy and dilatation. Significant are evidences of diminished force of impulse, the area which may remain normal. Of course, if dilatation has occurred the impulse is diffuse. Both sounds are weakened corresponding to the impulse, but necessarily the first sound shows the greater alteration on account of the muscular element; it is of less volume, shorter in duration, and higher in pitch, resembling the normal second sound, which is of course correspondingly diminished on account of the weakened distention. In some cases it is alone discernible.

The first silence is longer than normal on account of the shorter first sound. Thus the sounds resemble those of the fetal heart, particularly when the action is rapid. If on repeated examinations where the area is not increased there is noticed a greater relative diminution of the aortic second sound than of the pulmonic, it is fair to assume that the left ventricle is chiefly affected and vice versa. The greater involvement of the left ventricle can thus be demonstrated in the parenchymatous change resulting from high temperature in typhoid and other fevers.

The rhythm varies greatly. Extrasystoles, auricular fibrillation, auricular flutter, irregularities and abnormal rhythm due to injury of the conducting system, pulsus alternans may all be the expression of an injured or impaired heart muscle. The action of the heart may be regular and normal in frequency, particularly if dilatation is not marked. The source of the action of the heart is now placed in the muscle itself, and Gaskell describes as its functions rhythmicity, excitability, contractibility, conductivity, and tonicity. Consequently any of the various forms of arrhythmia may occur, including complete heart block and Stokes-Adams disease, also fibrillation. It must be remembered, however, that occasionally some of these conditions may occur and continue for years without recognizable existence of cardiac disease, and are quite often found in children. However, infrequency of pulse with or without hypotension, when observed after middle life, is, to say the least, suggestive.

An active business man applied for an increase of twenty thousand dollars of insurance, which was granted. Some weeks afterward he called my attention to the fact of the lowering of his pulse rate to about fifty-eight. A careful examination revealed evidences of cardiac degeneration, and notwithstanding treatment he died in an attack of angina (the first) within three months of his insurance examination.

I have always taught my classes to differentiate in the use of the terms frequent and quick as applied to the pulse. Frequency has to do with the number of beats to the minute, while quickness applies to the duration of the pulse wave. Conversely the difference between infrequent and slow should be noted.

Cardiac oppression and pain are frequently present, but are not always indicative of the severity of the case. I must agree with those who object strongly to the term false angina pectoris as differentiated from the true. Pains produced elsewhere and referred to the heart should be called extracardiac. But, on the other hand, it is important to recognize the frequency of epigastric pains and occasional epigastric Head's zones found in heart disease and probably the result of referred nerve excitation. These may explain the still too frequent and unwarrantable reports of sudden death from acute indigestion. I believe also that attacks of angina pectoris must be accepted to vary greatly in the degree of severity and need not present the classical description of the extreme degree, which to my mind frequently shows an advanced condition and consequent early death. Therefore the lesser degree, or anginoid pain, especially on exertion, is apparently no more dangerous than other cardiac symptoms. Indeed it must be remembered that cardiac pain produced by overexertion may occur in a perfectly healthy heart. On the other hand, its occurrence and continuance while at rest has an entirely different significance. Toxic angina in women is often less serious and may be due to intestinal tract with hyperesthesia of skin and muscles of abdomen often on one side. Aortitis, often due to syphilis, may produce a paroxysmal pain high in the chest and sometimes to the back of the neck without radiation. Tenderness on pressure of the left breast, so marked, may produce an attack of angina.

Early dyspnea, frequently with cough, especially without or but on slight exertion, and not accompanied by evidence of pulmonary edema, is, I believe, one of the most important symptoms. The edema itself is of course not grave, but if it is removed longer intervals of comfort may be secured. Occasionally the socalled *èdeme à bascule,* or seesaw edema, is noticed which changes from side to side according to the position of the patient. These attacks may be due to heart block or auricular fibrillation or flutter. Syncopal attacks are not uncommon and vary in intensity; the degree may be so great as to simulate apoplexy, without, of course, resulting paralysis. They may come on suddenly, independent of exertion, and resemble asthma or a continuous sense of suffocation, or, as already remarked, muscular exertion may be necessary to bring them into evidence.

Other symptoms are pale skin, mucous membranes bluish, and extremities cold, morale often depressed. Symptoms of venous distention are rare, except slight edema above the ankle; gastrointestinal symptoms and constipation are common, but dropsy is never present without dilatation, which, however, occurs in about one third of the cases. The amount of urine is apt to be diminished often to only one half or even one fourth the normal amount. A slight quantity of albumin and narrow hyaline casts may be present without kidney disease. The phenolsulphonephthalein test shows that the elimination is normal or but slightly decreased except in the primary renal group of cases, and more important the blood chemistry is normal or but little changed.

Hypertension is found in many, but by no means all, of these cases. Pulse pressure may be high. But in my experience hypotension is also to be dreaded. Both terms, however, are only relative ones and I have known several cases where the lowering of the systolic pressure below about 180 was attended by the return of pulmonary edema.

Coexisting degeneration of other organs often modifies the general character of the symptoms of fatty degeneration, but the existence of arteriosclerosis is no more pertinent to the diagnosis than the yellow arcus.

Fatty overgrowths rarely give rise to distinctive symptoms unless infiltration or fatty degeneration has supervened. Necessarily the heart sounds are less clearly conveyed to the ear than in health, but in these cases it has often seemed to me that after exercise the sounds become more distinct, while the contrary is likely to occur in cases of the degenerative form.

The determination of the function capacity of the heart is of great importance, but very difficult to estimate. Herz determines the pulse rate per minute and then causes the patient to extend and flex the right forearm without much muscular contraction for one minute. In the normal heart there is no change, but in the weak heart the frequency is reduced from five to twenty beats per minute. Shapiro counts the pulse first in the recumbent and then in the sitting position. In health the frequency should be increased from three to ten beats per minute, but in the weak heart there is an absence or diminution of this frequency. Barringer measures systolic blood pressure at intervals of thirty seconds after the cessation of varying amounts of work performed by raising dumbbells or a steel bar. He believes that if the curve formed by plotting these results, rises, i. e., if the systolic pressure reached the maximum not immediately at the cessation of work but from thirty to 120 seconds later, the work performed is overtaxing the heart. He believes that the amount of work just sufficient to produce such a blood pressure reaction may be used as a measure of the heart's functional capacity. Rapport, however, has shown that in normal individuals cessation of work is always followed by a rise in blood pressure, more or less proportional to the amount of work done. Pulse pressure determinations have proved of little value in the study of cardiac function.

I must express my regret that the röntgen rays are not more generally used in cardiac diagnosis. The use of the electrocardiograph is necessarily more limited, but there is no excuse for the limited use of the former. For some years past it has been my custom in teaching to have sections of the class present at the fluoroscopic examination and more recently in order to avoid the enlargement of the heart silhouette produced in the examination, I include the orthodiagraphic, or teleröntgen graphic methods for the excellent reason that I believe, and this notwithstanding the opposite view held by MacKenzie, that these are the most accurate methods of determining the size, shape, position and movements of the heart.

PROGNOSIS.

It is interesting to note that the negro mortality from one to five years and from thirty-four to fifty-six years is double that of the white, but the mortality in cases with severe cardiac pain in the white is increasing and is already double that of the negro. Up to twenty-four years the death rates of both white and negro females are higher than that of males, while later it is much higher for the males. Male Russian Jews show a peculiar liability to thromboangiitis obliterans. Eighty-five per cent. of the deaths after forty years and one fifth of all deaths are due to heart trouble.

Many patients die suddenly when the symptoms are either absent or not considered of sufficient importance to merit treatment; but too many cases of socalled heart failure with fatal termination are recorded in patients who have recently been under observation and in whom the condition was unrecognized. In most cases the outlook is most serious, but perfect recoveries of the parenchymatous fatty types after both acute and even chronic infections are everyday occurrences. And even in the cases accompanied by arteriosclerosis and dilatation much may be done to prolong life and render the patients comfortable provided they are made to recognize the important fact that they must cut down a varying but generally large proportion of their work.

TREATMENT.

The acute myocardial changes following infections are generally attended by a more or less persistent increased frequency of pulse rate, even while at rest, with a low blood pressure—approximately 90 systolic and 60 diastolic. A diminished pulse frequency in these cases can be accepted as a normal result.

Rest, followed by gradual exercise, is of main importance, with the exhibition of tonic doses of strychnine. In acute myocardial degeneration, which sometimes accompanies syphilis, the question arises as regards the use of Ehrlich's salts. Personally, I am inclined to believe that the administration of mercury, either hypodermically, by inunction, or by mouth, is the safer plan to pursue provided we subsequently obtain repeated negative Wassermann reactions. If this does not follow, or if, in the rare instance, mercury cannot be given—as in a case of malignant precocious syphilis that I reported—comparatively small doses of the older salt should be given in preference to the new, and of course the subsequent use of mercury. These remarks apply with equal force to the cardiac cases which develop in the later stages of lues, with the addition of the iodides, which are often very useful.

In the chronic forms sufficient exercise should be permitted, short of producing heart strain—alternating, if necessary, with periods of rest in bed. This can only be determined by a careful study of the individual case. All excesses are of course to be avoided. The food should be restricted to the necessary caloric value; meat diminished, and cooked in such a manner as to be most digestible. It is to be remembered that acute indigestion may cause death through the crippled heart. Liquids should not be taken in large quantities.

Attention to the condition of the bowels is of importance—the regular use of an afterdinner pill, or an occasional mercurial purge followed by a saline, alternating from time to time with high rectal irrigation. In persons of overweight the restriction of the use of fats, starches and sugars is often sufficient to cause a reduction and improvement of symptoms. Massage and medical gymnastics are especially useful in these cases.

The Oertel and Schott treatments are also useful in selected cases, and can be carried out at home with a trained attendant.

Digitalis, digalen, digipuratum and strophanthus are useful in the dilated group, but are to be used with high tension. I frequently add tincture of aconite to one of these preparations with satisfactory results. The intravenous method should be reserved for particular indications and extreme cases.

NITRITES.

Most useful is the soda salt, which can be associated with either aconite or digitalis. They can be given in larger doses than usually employed.

In the bradycardia group aromatic spirits of ammonia, fifteen minims every two or three hours, caffeine, and small doses of strychnine should be given.

Diuretin is useful in the edematous cases and may be associated with infusion of digitalis. Also the combination of calomel, digitalis, and squills.

Rather curiously there is a widespread fear regarding the use of morphine in these conditions. In my opinion it is one of our most useful drugs in the treatment of severe cases of heart failure, and I find that chloral hydrate is often more useful as a hypnotic than some of the newer preparations, such as barbital or veronal.

Venesection is useful in dyspnea due to threatening or existing pulmonary edema, particularly with dilatation of the right auricle, but it has no lasting effect in hypertension. It helps redistribute the blood and may cause an elimination of the water retained. If the hemoglobin percentage is below seventy it is contraindicated.

The amount of salt should be limited. Anemic patients should be given a fairly ample protein allowance, and kidney cases a diminished one. While in hypertension a diet of milk and vegetables should be recommended and the Karrell cure of twenty-five c. c. of milk to the kilo of weight is useful in fat subjects. Strong coffee and tea as well as much alcohol should be prohibited but on the other hand I know of nothing more useful in severe pain and asthma than cognac or whiskey and a good claret is one of the best appetizers and consequently blood makers.

In addition to massage respiratory gymnastics are useful. During inspiration the diaphragm is drawn downward with the result that there is an influx of blood in the chest cavity. Note the inspiratory collapse of the veins of the neck. At the same time pressure on the abdominal organs causes a rise in intraabdominal pressure as proved by swelling of the veins of the lower extremities, sometimes seen during inspiration. The patient is made to inhale deeply and to exhale in two steps in a cogwheel manner, twice daily, each time for a minute, with pressure of the hands against the lower part of the thorax.

In relaxed abdomens, particularly those with gastroptosis, an abdominal bandage is of great advantage, and I have some time found use for the heart bandage of Abbé (*Herstutze*).

Some Points in the Examination of the Heart for Life Insurance*

By FREDERICK W. PRICE, M. D., F. R. S., Edin.,
London,
Physician to the National Hospital for Diseases of the Heart; Senior Physician to the Royal Northern Hospital, London.

The examination of the heart is of special and enormous importance. In all probability the cardiovascular system is the most important of all in regard to life insurance, since the length of life of most individuals depends so largely upon the integrity of that system. The difficulty of the subject has been augmented by the increasing practice of accepting lives for reduced terms of years and with extra premiums. This involves the whole question of prognosis, admittedly a most difficult problem, which lies outside the scope of this article, but I may be permitted to say that the first essential for prognosis is an accurate diagnosis, especially with regard to irregular action of the heart and cardiac murmurs and their significance.

It is obviously impossible in the space at my disposal to deal with the whole subject of the examination of the heart for life insurance. I shall only attempt to deal with some of the problems which are the most common and of the greatest practical importance. I shall not, for example, deal with the subject of the history of previous illnesses, except to touch upon rheumatic infection of the heart in childhood. This is a subject of very great importance, and, notwithstanding the fact that the subject has, during recent years, received a great deal of attention, it is still not sufficiently realized how easy it is to overlook a rheumatic infection in childhood. In trying to elicit a history of such an infection, it is necessary to bear in mind the following facts: In children arthritis is often slight and may be even entirely absent, while affections of other parts are more frequent and constitute a more conspicuous feature of the disease. Thus, sometimes the affection is confined to the tendons or the fascia in the neighborhood of the joint, as, for example, the tendons of the hamstring muscles under the knee. Subcutaneous nodules, certain exudative erythemata, and purpura rheumatica are more frequent manifestations of the rheumatic infection. Chorea is a common indication. Tonsillitis is perhaps more commonly of rheumatic origin in childhood than in adult life. Lastly, cardiac involvement is a much more frequent manifestation of the rheumatic infection in children than in adults; it is at least as frequent an indication of the rheumatic infection as any other and should not be regarded as a complication; and it may occur in association with any of the foregoing, or with an indeterminate febrile attack, or alone, that is, it may be the only manifestation of rheumatism. Another point to bear in mind is that while endocarditis may occur acutely in children, as in adults, it often occurs in a subacute and insidious form, there being not infrequently a total absence of subjective symptoms, or, when these are present, they are often masked by other manifestations of the causal infection. It ought also to be remembered, with regard to rheumatic infection of the heart, that, when there is a clear or suspicious history of acute or subacute rheumatism, an apical presystolic murmur and a short sharp first sound at the apex, indicative of mitral stenosis, may not make their appearance until some years after the onset of the rheumatic infection, and that the appearance of an aortic diastolic murmur, signifying aortic incompetence, may be delayed, though not to so great an extent.

IMPORTANCE AND SIGNIFICANCE OF SUBJECTIVE SYMPTOMS.

The question of subjective symptoms in a person applying for life insurance is of great importance, for the following reasons: It is agreed that the essential cause of heart failure lies in the heart muscle, and if this view be correct, valvular defects, arterial disease, and disturbances of the cardiac mechanism —such as auricular fibrillation—should be regarded not so much as specific affections in themselves as from the point of view of the relation which they bear to the myocardium. Take the case of a valvular lesion. First of all, it can be readily understood that it is a mechanical disadvantage in the work of the heart muscle. But it should also be remembered that there are, as a rule, along with the valvular lesion, coincident changes in the cardiac musculature, the coronary arteries, or the aorta.

In all cases of valvular disease, therefore, it is of the utmost importance that we should endeavor to ascertain whether the lesion which has invaded the valve has also affected the myocardium, or the bloodvessels, or both. These morbid changes in the musculature of the heart may occur as an acute condition, which later on may become chronic; or they may occur as a primary chronic condition, as a result of degenerative changes. As an example of the former, an acute infection of the mitral valve by the

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*Read at a meeting of the Life Assurance Medical Officers' Association, London, January 4, 1921. The substance of this paper was published in a recent issue of the *Lancet*.

rheumatic poison may be cited. It is recognized that this is usually followed by organization, resulting in the formation of fibrous tissue, which tends to contract as life advances, ultimately giving rise to permanent stenosis, or incompetence, or both. It is also known that in every case of acute endocarditis there is probably always present some degree of myocarditis, and that acute myocarditis may occur independently of acute endocarditis. But it is not sufficiently understood that acute myocarditis is often followed by permanent structural changes in the myocardium, which, as in the case of endocarditis, may not fully declare themselves until some years afterwards, and we should always endeavor to ascertain the degree of these permanent structural changes. As an example of a primary chronic affection, resulting from degenerative changes, most cases of aortic incompetence which come on insidiously in males during or after middle life may be cited. As a rule there are coincident or secondary changes in the cardiac musculature, aorta, or coronary arteries, and it is our duty to endeavor to estimate the degree of these changes. Another point of importance is whether the lesion—be it the result of a previous attack of acute endocarditis, or primarily chronic due to degenerative changes—is progressive or not.

Now, with regard to the investigation as to whether the myocardium is involved or not, and if so to what extent, and whether the lesion which is present is progressive or not, while the results of physical examination—such as the size of the heart—are important, the most important question of all is that of the functional efficiency of the heart. Is this impaired, and, if so, to what extent, and is the degree of impairment increasing? Mackenzie has emphasized the view that the best way to answer these questions is to ascertain how the heart responds to effort; in other words, the amount of physical exertion in which the patient can indulge without experiencing symptoms of cardiac distress. It is, therefore, easy to understand the vital importance of ascertaining this.

I can fully appreciate the difficulty of the problem in the case of a person applying for life insurance, if for no other reason than the unfortunate fact that neither the examining room of a life insurance office nor the consulting room is always a Temple of Truth. Nevertheless, I would respectfully urge that some such question as, Do you experience shortness of breath, palpitation, fatigue, giddiness, faintness, precordial discomfort or pain, or a sense of pressure or tightness across the chest during or after considerable or moderate exertion? should be included in the examination form and put to each applicant for life insurance, and that a searching inquiry should be made, and also that some simple exercise test should be performed.

In conducting this inquiry it is essential at the outset that three facts should be borne in mind. The first is that the natural standard of the heart's strength varies in individuals, each individual knowing the kind and amount of exertion in which he can normally indulge without producing symptoms of cardiac distress, and being aware when there is a departure from this, and to what extent. Our inquiry should aim at finding out whether the normal standard of an applicant has decreased, and if so, to what extent, and whether it is still decreasing. The second fact which should be borne in mind is that symptoms of cardiac distress on exertion may be due to causes other than heart disease. Thirdly, the cardiac muscle may be merely temporarily exhausted, and this may occur whether the heart is diseased or not. But, provided extrinsic and temporary causes —such as anemia, sleeplessness, temporary physical or mental overstrain, and deficient tone due to lack of physical exercise—can be excluded, the fact of a departure from the normal standard of an individual, and its degree, may be taken as fairly indicative of the presence and degree of myocardial disease. Further, if the symptoms of cardiac distress on exertion are increasing—in spite of an adequate period of rest and the employment of other remedial measures—and provided again that we can exclude extrinsic and temporary causes to account for this, we may be satisfied that the lesion is progressing, and its rate of progress may be inferred by the rate of increase in the severity of the symptoms.

Passing to a consideration of the respective value of the various subjective symptoms, breathlessness is one of the earliest and a very important symptom, and the amount of exertion which the patient can undergo without becoming breathless is of great value in estimating the state of integrity of the heart muscle. It should be remembered, however, that it is a symptom common to many affections beside heart disease, such as anemia, pulmonary affections, and displacement of the contents of the abdominal cavity.

By palpitation I mean the consciousness of the cardiac impact against the chest wall, and with this there is frequently, but not always, an increase in rate. The term, as used here, does not include the sensations which may be present in extrasystoles, auricular fibrillation, auricular flutter, or paroxysmal tachycardia. While palpitation may occur in organic disease of the heart, it should be remembered that it is probably more frequent and most characteristically met with apart from organic disease.

A sense of exhaustion during or after physical or mental effort is a common symptom. Cerebral symptoms, due to a diminished supply of blood to the brain, may depend upon cardiac causes, especially aortic disease and myocardial degeneration. Among these symptoms are giddiness, syncope or fainting attacks, attacks closely resembling petit mal, lack of power of concentration, and early fatigue on mental effort. It should be noted that the attacks of giddiness so frequently complained of in old people have no necessary relation to organic heart disease.

While syncope may, and frequently does, occur in heart disease, it is probably as frequently due to some temporary functional derangement, being not infrequently the result of vasomotor instability. Attacks closely resembling petit mal may occur in elderly people, especially in those with arterial disease and myocardial degeneration, and in the early stages of heart block, and it is sometimes extremely difficult to distinguish them from fainting attacks. The latter are, as a rule, preceded by a preliminary sensation of great weakness, giddiness, loss of sight, and, it may be, nausea and vomiting, while during an attack the face becomes of a greenish pallor, the patient breaks out into a clammy sweat, respiration almost or completely ceases, and the pulse at the wrist is feeble or even imperceptible; the return to consciousness is gradual.

Pain in the precordium is a frequent symptom of heart disease. The most characteristic feature of pain due to heart disease is that it is brought on by exertion, though it should be noted that the pain may not come on until some hours after the exertion which has induced it. The site of the pain is frequently in the neighborhood of the apex beat, but it may be complained of over any part of the precordial area. The pain of angina pectoris, on the other hand, is almost always over the sternum, a point which I shall refer to later. The pain in heart disease may be constant, dull, and aching; or recurring and sharp; or may present the characteristic features of angina pectoris. While pain in the precordium may occur in organic disease of the heart, it should be remembered that it is also frequently met with apart from this, especially in females. A constant, dull and aching pain is of greater diagnostic value than a sharp recurring pain, usually indicating a tired heart. Accompanying pain in the precordium, or occurring independently of it, there may be a sense of oppression or tightness across the chest, and tenderness in the precordium may also be associated with it.

Angina pectoris is not rarely missed. While the term is usually employed to denote a paroxysmal attack of pain in the region of the heart—the paroxysmal nature of the pain being its characteristic feature, with a tendency to radiate in certain directions, and being accompanied by a feeling of constriction within the chest and a sense of impending death, it should be remembered that this description is that of a typical and severe attack, and there are many grades and modified forms of this affection. For example, on physical exertion or emotion, there may be only a little discomfort or pain felt over the sternum, radiating to the arm and neck, and accompanied by a feeling of uneasiness and distress, which may at first disappear as soon as the exciting cause ceases, but at a later stage may continue for some time after its cessation. Will you allow me to emphasize the fact that the pain of angina pectoris is almost always over the sternum. Less frequently it is on one side of the chest or the other, usually on the left side. I have seen a number of cases in which the pain was strictly limited to the epigastrium, and some had been diagnosed as cases of dyspepsia, because the patient had told his medical practitioner that the pain occurred after food; but, on further inquiry, it was not difficult to elucidate the fact that pain after food occurred only when physical exertion was indulged in. The pain in angina may also begin in the left arm, or the jaw, or the left pectoral muscle, or even in the left leg. The fact that the pain at first occurs during or after exertion is of fundamental importance with regard to diagnosis.

Lastly, with regard to subjective symptoms, it is necessary to distinguish between those due to septic infection—as, for example, from the teeth, the tonsils, or the bowel—and those due to organic heart disease. In the former, the most prominent symptom is a sense of exhaustion after effort. There is frequently a sense of depression, often accompanied by irritability of temper, and of giddiness and faintness, which may disappear on lying down, and vasomotor instability in varying forms is often a marked feature; and when palpitation and precordial discomfort or pain are complained of, they frequently have no relation to exertion. In the case of subjective symptoms due to organic heart disease, on the other hand, the nervous and vasomotor symptoms are little, if at all, in evidence, the earliest subjective symptoms are primarily cardiac, of which breathlessness, palpitation and precordial discomfort or pain are the most prominent, and they usually arise as a result of effort.

PHYSICAL AND INSTRUMENTAL EXAMINATION.

We will now pass to a consideration of some of the results to be obtained by physical and instrumental examination, and we will first deal with the arterial pulse.

Rate of the pulse.—May I at the outset suggest that in each case the pulse should always be taken both at the beginning and at the end of the medical examination. May I also emphasize the importance of bearing in mind the fact that the rate of the radial pulse does not necessarily represent the ventricular rate, for not infrequently in irregular action of the heart many beats are so feeble that the pulse waves do not reach the wrist (Fig. 1); the ventricular rate should, therefore, be counted at the apex, either by palpation or auscultation, preferably the latter. While the normal rate of the heart is about 72 a minute, it should be remembered that it has a considerable range of variation in perfectly healthy individuals; in some it is always above this average, and has been known, although very rarely, to average 120 a minute, whereas in others it is always correspondingly infrequent. It is difficult, therefore, to decide when an increase of the cardiac rate in an individual is pathological. In this connection, a record of the past history is of value.

Among the causes of the pathological form of tachycardia, other than the various forms of heart disease, I would mention the excessive use of alcohol, tobacco, tea and coffee, septic absorption from the teeth, the tonsils, or bowel, and pulmonary tuberculosis. The increase in the rate of the pulse when an individual assumes the upright posture after lying down is normally not more than at the most 20 a minute. Anything above this is especially suggestive of vasomotor instability. The increase in the rate of the pulse induced by physical exertion varies in healthy individuals; it may be marked on severe physical exertion, even when the individual is in training, and not infrequently the rate is increased up to 120 or even 140 a minute on even moderate physical exertion. It is, therefore, difficult here also to determine whether an increase in rate is pathological. In this connection, the presence or otherwise of accompanying subjective symptoms of cardiac distress is of fundamental importance. The time which may elapse before the pulse rate returns to the normal after exertion is of greater diagnostic significance.

(*To be concluded.*)

Editorial Articles

PURGATION

Dr. Pedro of Rio Janeiro has called attention to the dangers of indiscriminate purgation. He mentions the fact that, a century ago, not only were purgatives in routine use but also emetics and bleeding. Doubtless the emetics were sometimes, perhaps often, needed by our ancestors who surpassed us in the art of stuffing themselves. Purgatives would seldom be needed were there more care of diet and defecation, but as we, of our era, are notoriously careless about both, these drugs still find a place of the highest prominence and usefulness.

Nevertheless, it is high time that attention was called to the too frequent and the routine use of purgatives, for these drugs are by no means without their dangers and are certainly not to be used in any case for the mere sake of giving something. Perhaps purgatives are most abused in hospitals, where, alas, their administration to the new arrival proceeds with the certainty of the laws of the Medes and Persians. It matters not if the patient's life hang by a thread which a vigorous cathartic may sever, or if he has been physicked without end before entering the institution, he gets his ten grains of calomel, or its equivalent, just the same. We have seen more than one victim of pneumonia work himself to extinction over the bedpan.

Time was when every patient to be operated upon must be purged just previous to the ordeal, even if sent in by a physician who had already castor oiled the patient to the limit. How some of those who have been operated upon under such conditions have survived is a mystery.

The routine use of purgatives in digestive disturbances which are due to constipation, does not, of course, cure the condition. As Dr. Pedro remarks, it is the easy thing to do and, we fear, we are all inclined to do the easy thing. It is certainly troublesome to go into all the details of instruction in the habits which a patient must acquire in order to rid himself of faulty functioning of the bowels.

It is something of a shock to learn from Pedro that the use of purgatives in food poisoning is not beneficial. At any rate, in a group of twelve cases, which he cites, those treated without catharsis did much better than those who were purged. Pedro also believes purgatives do more harm than good in uremia. This may seem an extreme statement, but should cause us to think over the matter. In many acute conditions accompanied by fever, the immediate fall of temperature attributed to the action of a cathartic is deceptive, as this is due to general depression from the drug, and the temperature again rises when the result of purgation passes.

To return again to the subject of constipation, and especially in children, the physician who gets the young mother into the way of depending on food, water, and daily habit, instead of upon the bottle of laxative, helps the family to which he ministers, not only physiologically but economically, for the sum paid for patent bowel movers is something astonishing.

CARDIAC ACCIDENTS OF THYROID ORIGIN

Tachycardia is a symptom in Basedow's disease which undergoes considerable variations. Among the paroxysmal tachycardias met with in this morbid process there are two principal types, namely, auricular tachysystolia, which consists of a considerable acceleration of the auricular contractions—about three hundred—while those of the ventricle average about one hundred and fifty, and a total disorder of the ventricular contractions in their relation to fibrillation of the auricles. The permanent tachycardia of exophthalmic goitre is normotropic with paroxysmal attacks, but occasionally it may be complicated by heterotropic crises, a notion of importance in the study of the latent symptoms of Basedow's disease.

It was formerly supposed that the blood pressure was below normal, but recent researches—those of Lian and Gallavardin in particular—have shown that hypotension is uncommon and that a slight hypertension usually exists.

From the viewpoint of pathogenesis, as well as the genesis of the disturbances of the cardiac rhythm and hypertension, careful attention should be given to hypertonia of the sympathetic which is always constant in exophthalmic goitre. Hypersympathicotonia with or without hypervagotonia would seem to result from a toxic nervous impregnation. These patients are autointoxicated by the abnormal products of thyroid secretion which act on the heart, impregnating in turn the cells of the myocardium. These data explain the mechanism of the asystolic accidents occurring during the evolution of Basedow's disease and which appear to be quite independent of any valvular lesion. The cardiac exhaustion is the consequence of both hypersympathicotonia which overworks the heart and the autointoxication inherent in the disease which poisons and causes changes in the cardiac musculature. Asystolia is all the more prone to occur when rheumatismal or syphilitic valvular changes previously exist. Thus can be explained various systolic murmurs detected in exophthalmic goitre and have been variously interpreted.

Orthoradioscopic investigations have confirmed what clinical researches have already taught us. The aorta is frequently involved in exophthalmic goitre, presenting a certain degree of dilatation and occasionally a distinct aortitis can be detected. Lian has shown that there is often a cardiac hypertrophic dilatation, first of all present in the left ventricle.

The latent symptoms of exophthalmic goitre are characterized by the attenuation or even absence of ocular and thyroid manifestations and predominance of cardiac disturbances, these usually being a permanent tachycardia, with or without paroxysmal crises. Ovarian insufficiency causes the largest number of these latent conditions. To make a diagnosis of the latent syndrome of exophthalmic goitre one must also discover one or two thyroid or ocular signs of the disease as well, especially the latter. Graefe's sign is, according to Attler, found in twenty-one per cent. of the cases, Stellweg's sign in sixty per cent. Hyperesthesia of the thyroid region—first described by Lian in 1918—should be looked for, although it is rare.

Laboratory researches are of little avail in the diagnosis. Kocher's hemoleucocytic formula is not to be relied on. The adrenalin test does not prove that the symptoms are due to the thyroid. An increase of metabolism, according to Dubois, from twenty-one per cent. to seventy-five per cent., is seen in latent exophthalmic goitre, so that treatment directed against this disease may reveal the true nature of the symptoms presented by the patient.

In myxedema and mild hypothyroidea, hypotension with clinostatic tachycardia and acrocyanosis represent the cardiovascular symptoms. The hands are cold and blue, the pulse small, weak and hardly perceptible. In other words, phenomena inverse to those present in hyperthyroidea are met with. The administration of thyroid preparations will give excellent results in these cases.

In ordinary goitre there are three toxic cardiac processes, viz., thyroidopathic cardiac hypertrophy giving rise to disturbances of variable intensity, the thyrotoxic goitrous heart strictly speaking, with accentuation of the cardiac disturbances, and lastly, the torpid goitrous heart. In the latter form all the symptoms of Basedow's disease may develop in a case of long standing goitre, an eventuality that should be recalled in all forms of goitre having a slow evolution.

NEW YORK'S HOSPITAL BED CAPACITY

The results of a study of the files of the Division of Institutional Inspection, made by Dr. C. E. Banker, are published in the January number of the *Monthly Bulletin* of the New York City Department of Health in an article entitled Hospital Bed Capacity of New York City. Doctor Banker states that all institutions in the city which may reasonably be classified as hospitals have been included in the study, with the exception of certain institutions that have ceased operation during the year, organizations that have torn down their hospital structures with the intention of rebuilding and, for this reason, are at present not receiving patients, and a small number of institutions that harbor sick or convalescent children for a few months during the summer, but maintain no service during the colder months of the year. "While the Department of Health takes a broad view," writes Doctor Banker, "of what constitutes a hospital, and the hospital bed capacity of the city, the beds in institutions other than hospitals which are set aside for isolation purposes, and those set aside by institutions for the care of their own inmates, and those maintained in institutions outside the city limits, are not included in the figures presented. . . . It must be remembered, however, that they are true for the present only, for new organizations are being formed and new hospitals erected, old hospitals are closing their doors for one reason or another, and the hospital bed capacity of the city is continually in a state of flux. The figures here presented we believe to be unusually accurate and up to date, for they are based, almost exclusively, on a questionnaire sent out by the Division of Institutional Inspection, within the past month, and the population figures are those of the Department of Health estimate for October 31, 1922."

These data show that, at present, Greater New York has, within its limits, 216 public, semipublic, and private hospitals to care for those of its population of 5,896,124 that may need hospitalization. In these institutions are 44,793 beds for the reception of patients. This makes an institution for every 27,125 persons, and a bed for every 131 persons. Classified by type of hospital, the figures are: for the twenty-five public hospitals of Greater New York, 24,288 beds; for the 121 semipublic hospitals, 18,767 beds; for the seventy private hospitals, 1,738 beds. On the basis of a broad classification, the various special hospitals of the city gave the following figures: for women and children, including maternity hospitals, 3,680 beds; for mental and nervous cases, including mental defectives, 10,523 beds; for cancer and allied diseases, 201 beds; for contagious diseases, 2,317 beds; for incurable and chronic cases, exclusive of tuberculosis, 1,613 beds; for tuberculosis, 2,435 beds; for treatment of diseases of the eye, ear, nose, and throat, 689 beds; for orthopedic defects, 435 beds; for the national public health service, and the care of the soldiers, sailors, and marines that may be within our gates, 3,088 beds; for convalescents and those on special diet, eighty-eight; for diseases of the digestive system, fifty-one; for the special study of selected diseases, sixty. This makes a total of 25,180 beds. If we subtract these from the total bed capacity of the city, the balance, 19,613, represents the bed capacity of the general hospitals of the city, but in this case also the term general is a loose one.

Two classes of patients have most meagre accommodations—convalescents and mental cases. The former because provision for them in the hospitals of the city is very limited, their beds are needed for new acute cases, and the hospitals, in cases of free or part pay patients, are relieved by their discharge of the not inconsiderable expense of their care. Provision for the care of mental cases is extremely inadequate and limited in the city. Dr. Banker's conclusion is that "except for the two groups mentioned above, and, possibly, the group for chronics and incurables, where there appears to be lack of beds for those able to pay in part for their care, the city seems to be fairly well provided with hospital bed facilities at the present time."

THE HEALTH ORGANIZATION OF THE LEAGUE OF NATIONS

Among other articles that have appeared recently in leading periodicals, giving accounts of the work of the comparatively little known health activities of the League of Nations, are one by Dr. Wickliffe Rose, general director of the International Health Board of the Rockefeller Foundation, in the *Review of Reviews,* entitled Epidemic Control in Europe and the League of Nations; and The Health of Nations, by Gertrude Seymour, in the *Medical Woman's Journal.*

The aim of the Health Organization of the League of Nations may be stated as the correlation of the activities of national public health administrations. It seeks to initiate action which cannot be undertaken by a single administration, and, in times of emergency, to aid national administrations, but not to assume permanently national responsibilities. Hence, it is by nature both advisory and executive. Also, it is essentially a technical organization, with a highly specialized field of action, hence the principles upon which its actvities are based have been formulated by specalists in public health, and its membership has been chosen, not according to political, but according to professional standing. As a technical body, it is composed of a committee, a secretariat, and a consultative conference. The committee is composed of sixteen members prominent in the public health activities of thirteen countries and of three international societies. The one woman member of the committee is Dr. S. Josephine Baker, vice-chairman of the child hygiene section of the American Public Health Association, and director of child hygiene in New York City. The secretariat is composed of a director and staff, with headquarters at Geneva, who execute the decisions of the Health Committee. The director is Dr. Louis Rajchmann, who was chief of the Polish Health Service during the war. At the beginning of the current year, Dr. Edgar Sydenstricker, of the U. S. Public Health Service, was put in charge of the work in epidemiology. The consultative conference of the organization is at present supplied by an unofficial voluntary cooperation with the Office International d'Hygiène Publique.

Miss Seymour, in her article in the *Medical Woman's Journal,* gives an admirable outline of the program laid down by the specialists composing the health organization: "They advised that the International Health Organization should advise the League of Nations in matters relating to health; bring the administrative health authorities of all countries into a closer relationship of acquaintance, communication, and confidence; effect a rapid exchange of information regarding diseases, especially as these threaten to spread from one country to another, so that immediate precautions may be taken; aid in concluding or revising international agreements and ascertain how such conventions are being made effective; cooperate with the Labor Office in matters of industrial hygiene, and with the League of Red Cross Societies and other international voluntary societies, in health matters of international concern, and to send missions on public health questions when desired by a country to do so."

Among specific practical applications of this program, the following activities may be mentioned. Work in controlling epidemic conditions has been carried on through the health administrations of both the larger and smaller states adjoining Russia, contributions from the former having not only made their own territories safe from disease, but helped the feeble governments of the lesser states to cope with it and to establish sanitary, preventive conditions. This work, originated in Poland, has extended to Ukrania, Latvia, Lithuania, and Russia. Epidemic conditions and methods for their control are being studied in the ports of the Far East. A special tour of the refugee camps of the Near East has recently been made. In response to a call from Athens, a representative has been sent to Greece to cooperate in the supervision of the refugee camps there. Special studies and surveys are also being carried on relating to drug traffic and control, venereal disease control, sleeping sickness in Africa, and tuberculosis. Important work is being done in regard to revising the International Sanitary Conventions of 1912. Valuable reports have been made as results of surveys of disease conditions in various countries, among them six on epidemic and famine conditions in Russia. Several conferences of note have been held for exchange of ideas and opinions through lectures, papers, and discussions, and through inspection of institutions. The Rockefeller Foundation provides by gift for such interchange and conferences.

Surely the recital, which is the briefest outline, of such accomplishments in promoting international health is enough to justify to an extent at least the effort to correlate national interests which affect the interests of the human race as a whole under standards of world wide benefit and physical, mental and moral health—even though the idea of world peace, which would eventually be one of the results of such international cooperation, seems to be a subject for discredit and derision only to a certain type of American politician.

THE MENACE OF DRUG ADDICTION

The medical practitioner who has his eyes open knows how prevalent and widespread drug addiction is in the United States. He sees the wrecks which are being produced and the potential criminals which are being daily created. If he stops to think, he must realize how seriously public safety is thus threatened and how gravely civilization is menaced by this wave of international narcotism.

While it is true that relatively few of the thousands of miserable habitues have been produced by medical carelessness or criminal drug pandering by physicians, the medical profession is not wholly without blame. Modern chemistry and therapeutics and the laudable but sometimes mistaken desire to prevent or relieve pain have opened a veritable Pandora's box and an incalculable amount of harm has been done. The time has come when the medical profession must subject itself to the most rigorous regulation in order that not a single grain of heroine, morphine or cocaine is ever prescribed and that it be administered only to meet a proved therapeutic necessity. By this means only can we expiate the tremendous sin to which we have been innocently contributory. Those physicians who have so prostituted their holy calling as to lend it to the continuance of these destructive and debasing habits must be summarily estopped from further practice and forever banned from association with decent practitioners.

Here is a mental pestilence which is claiming its victims in all walks of society, creating a vast army of addicts which is largely composed of young men and women but which does not disdain youths and children. Eventually it leads to mental, moral and physical death. It is an archproducer of crime, a corrupter of the legal machinery of government and a ravaging destroyer of the very foundations of society. Its ultimate source is greed, the avarice which traffics in the bodies, minds and souls of humankind. The production and sale of habit forming drugs is one of the most profitable businesses known to man. To carry on this nefarious trade, enormous organizations backed by tremendous amounts of capital have been formed and from the poppy fields of Turkey, Persia and India and the coca groves of South America and Java their sinister operations extend into the very heart of American life. Bribery and corruption, deceit and smuggling, bestiality and murder are the agencies by which this traffic runs through the chemical works of England, France, Germany and the United States, through the ports of the world and the distribution centres to the horde of criminal drug venders and their weak dupes. The Harrison Act is only a puny preventive while the Miller Act, excellent law though it be, is powerless without adequate appropriations. The dope ring is well entrenched; it is organized with hellish ingenuity; it is provided with much money. Only the most strenuous national and international efforts will tear it up by the roots. Sordid greed is not easily controlled.

As a profession, we must purge ourselves of our dope peddlers, a band of ravening wolves parading as ministers of healing. We must make sure that our hospitals, asylums and corrective institutions are protected against invasion by soulless narcotic sellers and that there are a sufficient number of sanatoria for the salvaging of addicts. As citizens, we must see to it that there is an open season for all illegitimate drug venders. We must insist on the thorough enforcement of the Federal, state and local laws which aim at the control of habit forming drugs. These are not prohibition laws, neither are they revenue acts, these are measures for the protection of the public health and should be administered as such only. The public should be well taught the horror of drug slavery.

But these only scratch the surface. The great underlying cause must be logically attacked. Freedom from the curse of heroinism, morphinism and cocainism will only come by adequate control at the source. There is little difficulty in checking up banknote paper so that not one square inch is lost from the first step of its manufacture to the point where the citizen receives it as legal tender. Similarly, there must be absolute control of all narcotics from the source where the raw products are grown, up to and including the point where they are administered by the physician to relieve a well recognized condition. We must not prate about interference with the rights of medical practitioners. If we are honest in our desire to get rid of this deep rooted evil we cannot logically object to the complete regulation of the administration of these dangerous preparations.

These things can only be brought about by concerted international action. The League of Nations is striving to work out a plan for the international combat and control of the habit forming drugs. Our observers at the meeting now going on should be given greater latitude in aiding in this movement. Surely there can be no political significance in our active participation in what is entirely a great international health movement. If America does not actively cooperate, a complete victory will not be achieved and we will suffer in exact proportion to the extent that we evade this serious responsibility. A dangerous situation confronts us; we must ruthlessly attack it.

ENLARGED RINGS

Probably no disability is causing the industrial surgeon and the employer so much annoyance as hernia. Where an examination can be made before engaging a workman the matter is simplified to some extent, though in the ruling of certain states claims for compensation can be made on a hernia that was known by all parties to exist at the time of employment, on the ground that it was made worse by the labor in which the man was engaged.

The whole subject of hernia and of the connection of hernia with occupational trauma needs a thorough study and the getting rid of much that is groundless tradition in the literature. The question as to whether hernia is produced frequently by occupational stress has by no means been proved. A few years ago someone hit upon the idea of determining the possibility of future hernia by digital examination of the external rings. It was a happy thought, or at least was so considered, but such examination has proved practically worthless.

That such examination could be of value is negatived by second thought as well as by the proof from experience. A hernia never begins at the external ring. It begins at the internal ring, which cannot be reached by the examining finger, or it comes through structures lying directly behind the external ring, with which the ring has little, or nothing, to do. The size of even the internal ring is of comparatively little moment, for the bowel is so extremely thin and moldable that a bit of gut of pinhead size presenting against it directly, would quickly, work its way through, just as a bladder filled with water can readily be pushed through the keyhole of a doorlock.

Hernia is a congenital affection due primarily to the assumption by man of the erect position with the consequent disarrangement of the muscles and fascia of the inguinal region as they are so nicely built in our quadripedal ancestors. The structural conditions must be more or less imperfect or it does not occur, but the mere size of the external ring is far from being a prophetic guide as to its future occurrence. Some more certain sign must be sought.

CHILD LABOR STATISTICS

The returns of the Census Bureau show that the proportion of gainfully occupied children ten to fifteen years of age in the United States was markedly reduced from 1910 to 1920. In 1910, the number of boys engaged in gainful occupations was 1,353,139, or 24.8 per cent.; of girls, 637.086, or 11.9 per cent. of the total number of children. In 1920, the number of boys was 714,248, or 11.3 per cent.; of girls, 346,610, or 5.6 per cent. of the total number of children. A table of the occupational groups shows that the largest decrease was in agricultural pursuits, amounting to 785,119 children. The reductions for all other occupations combined amounted to only 144,248. This great decrease of the number of children in the agricultural group is thought to have resulted from the shift of the census date from April 15th, in 1910 to January 1st, in 1920. The decrease in the number of child workers in mines and quarries is reported as being largely due to additional legal restrictions of such employment. Both these reasons affected other groups to some extent. In general, it is said, the decrease for children was but a part of a corresponding general decrease for all persons.

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Obituary.

Dr. Wilhelm von Röntgen.—The famous discoverer of Röntgen rays died in his seventy-seventh year at his home in Munich. In 1895 Dr. Röntgen made his great discovery of Röntgen rays or x rays, and in 1900 he received the Nobel prize for physics, the same year in which the first Röntgen Ray Congress took place in Paris.

Dr. Röntgen received the Rumford Medal of the Royal Society in London in 1896. He also made investigations of value in other branches of physics including elasticity, capillarity, the conduction of heat in crystals, and the absorption of heat rays by different gases.

News Items

Dr. Lieb Advancement.—Columbia University announces that Dr. Charles C. Lieb has had advancement in grade from associate professor to professor.

Dr. Garretson Resigns.—Dr. William V. P. Garretson has resigned as attending neurologist to the Reconstruction Hospital, Central Park West and 100th Street.

Dr. Arthur I. Blau Returned.—Dr. Arthur I. Blau has returned from his pediatric work abroad and is now practising his specialty at his new office, 815 Park Avenue.

Eleventh Harvey Lecture.—Dr. Karel Frederik Wenckebach, professor of medicine, University of Vienna, delivered the eleventh Harvey Society Lecture at the New York Academy of Medicine, on Saturday evening, April 28, 1923. His subject was The Rhythms of the Heart.

Pittsburgh College Annual Dinner. — The Pittsburgh College of Physicians will hold their annual dinner known as the Second Bedford Lecture, on April 26, 1923, at 6:30 p. m., at the Duquesne Club, 325 Sixth Avenue, Pittsburgh, Pa. The essayist for the evening will be Dr. Sydney R. Miller, of Baltimore, Md., and the subject will be The Future of Our Profession.

Distinguished Japanese Physicians Visit State Health Department.—Three members of a party of distinguished Japanese scientists now visiting the United States under the auspices of the Rockefeller Foundation are spending a few days in Albany in order to study the work of the State Department of Health, including especially the State Laboratory, to which the visitors are giving an entire day.

Final Lorenz Clinic.—Dr. Adolph Lorenz gave his final public clinic of a series that he has held at the Health Department headquarters, 505 Pearl Street, recently. Sixty patients were examined, most of them children. Dr. Lorenz was assisted by Dr. Franklin B. Van Wart, orthopedic surgeon of King's County Hospital, Brooklyn, and by Dr. Thomas Martin and Dr. I. Cohn, of the Bureau of Child Hygiene of the Health Department.

Brooklyn Diagnostic Society Session. — The Brooklyn Diagnostic Society will hold its twenty-seventh session on Monday evening, May 7th, at 8:45 p. m., at the Institute Building, 867 St. Marks Avenue, Brooklyn. Program: Blood Transfusion, a Motion Picture Demonstration of the Author's Method, by Dr. Lester J. Unger, New York, and Carcinoma of the Breast, by Prof. John F. Erdmann, New York. Discussion. Dr. J. Gutman, chairman; Dr. Samuel S. Markell, secretary.

Mount Sinai Hospital Medical Board Holds Memorial Meeting.—The Medical Board of the Mount Sinai Hospital held a memorial meeting in the Blumenthal Auditorium, 1 East Ninety-ninth Street, on Monday, April 23, 1923, at 8:30 p. m., in appreciation of the work and influence of Dr. Arpad G. Gerster. The speakers were Dr. L. S. Pilcher, on Dr. Gerster's Services to Surgery in America; Dr. Howard Lilienthal, on Dr. Gerster as Teacher and Hospital Surgeon, and Dr. B. Sachs, on Dr. Gerster as Man and Scholar.

Cleanup Week in Virginia.—The week of April 16th has been set aside as cleanup week by the Virginia Board of Health. Information along health lines may be secured by writing to 1110 Capitol Street, Richmond, Va.

Tuberculosis Decreases.—The death rate from pulmonary tuberculosis in Nassau County showed a decrease of 17.3 per cent. in 1922 compared with the rate for 1921, according to figures issued by the Nassau County Sanatorium. The figures also show that there has been a decrease of 31.6 per cent. since 1919. This is contrasted with the decrease in United States registration area as a whole, which was only three per cent.

Smoking Beneficial. — Dr. E. P. Roger, of Paris, has carried out a series of experiments in which he claims that nicotine is not so dangerous as we hitherto have been given to understand. Having taken ten grams of ordinary French caporal tobacco, Dr. Roger extracted all the nicotine, producing a liquid which was sufficiently poisonous to kill a dog weighing sixty pounds. The doctor then took ten grams of the same tobacco and incinerated it under conditions similar to that of a pipe, producing a liquid which contained not only nicotine, but all the other chemical substances contained in tobacco. This liquid did not kill a guineapig weighing two pounds and produced no effect whatsoever on the intestines of a dog weighing sixty pounds.

Low Records in Communicable Diseases in 1922.—From the standpoint of communicable diseases the year 1922 was one of the most satisfactory in the sanitary history of the State, according to a summary made public by Dr. Hermann M. Biggs, State Commissioner of Health. Comparing 1922 with 1921, Dr. Edward S. Godfrey, Jr., Director of the Division of Communicable Diseases of the State Department of Health, reports declines last year both in the number of cases and in the number of deaths for most of the important communicable diseases, including typhoid fever, diphtheria, scarlet fever, measles, whooping cough, infantile paralysis, smallpox, and cerebrospinal meningitis. The number of cases of chickenpox and German measles also declined. On the other hand pneumonia and influenza were materially higher in 1922 than in 1921, though lower than in any other year since 1917.

Postgraduate Courses for Physicians.—Postgraduate courses for physicians of from ten to twelve weeks' duration will be given at the University of Göttingen, University of Frankfurt am Main, and the University of Leipzig during the summer of 1923. Modification in the period of the courses, and related matters, may be made to meet individual requirements. The courses will cover an intensive postgraduate study of all medical subjects, both theoretical and practical; the subjects will be generally selected by the applicants. Upon the conclusion of the courses duly authorized diplomas will be issued by the universities. Postgraduate courses at these universities can be arranged through the Academic Tours, Inc., Knickerbocker Building, 152 West Forty-second Street, New York.

LONDON LETTER

(*From our own correspondent.*)

London, *March 23, 1923*

ASIATIC REFUGEES A MENACE TO THE WORLD.

Conditions existing in Greece and Turkey at the present time are arousing alarm throughout the world. As a result of the Turks' victory the Greeks have been expelled wholesale from those parts of Turkey which had been made over to them by the Allies. Sir Patrick Hehiv, who went to Greece a short time ago to investigate the state of affairs, sent a report of his investigations to the *Lancet,* which was published in that journal on March 17th, last. He found that in Greece there were about one million refugees and that conditions could hardly be worse. In the *Daily Telegraph,* March 21st, last, there was published a report from Athens on the refugee situation in Constantinople prepared by Dr. Wilfrid Post, of Boston, the foremost medical authority in Eastern Europe, where for the past ten years he has been professor of medicine in Robert College, Constantinople College, and at the American Hospital, and is now on special service as medical director of American Near East Relief in its Constantinople refugee work, in which he is cooperating with Major McKinley and Major Hobson, of the British Sanitary Commission. Dr. Post states without hesitation that the present state of affairs in Constantinople is an outrage on humanity and a serious menace to the health of the world. Effective quarantine is impossible, owing to the magnitude of the problem.

Dr. Post then goes on to describe the indescribably filthy habits of the unspeakable Turk and the disgustingly dirty condition of the refugees who are being decimated by such diseases as typhus and dysentery and who, when the dry season comes, every camp and its surrounding heaps of filth will be active foci of contagion, and cholera and dysentery will claim its victims. With the present death rate the number of refugees will be reduced by one half within a few months. Moreover, if the Turks put into effect the new customs regulations their prohibitive duties on flour, milk and other necessities of life will end all relief work. All the American Relief and the British Sanitary Commission have been able to do thus far has been to feed and vaccinate the refugees, furnish them with mats and blankets, and also with baths, as far as facilities can be provided. According to Dr. Post's estimate the refugees now at Constantinople number about thirty thousand, and the majority arrived in the most wretched condition. They were forced to choose between deportation far into the interior of Asia Minor, among hostile tribes, or exile. Many died before reaching the sea and still more in the crowded, filthy ships. When they finally landed in Constantinople they could have been saved, the majority at any rate, by comfortable quarters and good food, but they were jammed into buildings pitifully inadequate and unsuitable and received no food save relief rations of a limited amount of bread and a daily dole of soup. In addition to bad conditions on land, there are many ships in the harbor crowded with refugees. There Dr. Post saw patients suffering from smallpox, typhoid, dysentery, pneumonia and typhus lying in huddled heaps together and he asks what is the remedy for the situation? In his opinion the only solution would seem to be the establishment in Greece of a vast refugee camp similar to that used by the British near Bagdad for fifty thousand refugees in 1918. No further deportations from the Black Sea should be tolerated, and something more than stereotyped official assurances should be insisted on by the allied powers. At present the Turkish Government is doing nothing for the refugees except to supply housing space, which is totally insufficient and inadequate. They have given no food, medicines, clothing, or fuel. With the Angora Government in its present frame of mind it is useless to await any friendly interest on behalf of the refugees. Greece is already greatly overburdened, the Constantinople relief committees are overwhelmed and the hospitals are overcrowded. The problem demands immediate drastic action by outside agencies, for the present situation is an increasing disgrace to all civilization.

Both Sir Patrick Hehiv and Dr. Post are agreed as to the refugee situation being at one and the same time a disgrace to civilization and a menace to the world. Dr. Copeland, of New York, a few months ago sounded a note of warning in this direction. The Turks are fatalists, as well as being of incurably filthy habits, but the refugee menace certainly seems to be a situation in which the Turks should be compelled to employ humanity and ordinary decency and cleanliness in order that these filth diseases should not overrun Western Europe and invade all the countries of the civilized world. The Allies might act through the League of Nations. Turkey joined the League when she thought it would be to her interests to do so, but flouted its authority when it did not fit in with her plans. The world is so upside down at the present time that it is difficult indeed to know where one country or another stands. No one would think now that Turkey was a beaten country, but rather one which could dictate terms. Still surely Turkey will not be allowed to be a standing menace to the health of the world.

DRUG ADDICTION AND DRUG TRAFFIC.

As was mentioned in a previous letter, drug taking, especially cocaine, has been greatly on the increase in this country since the war. In order to cope with the prevalence of this vice, an extremely drastic amendment is added to Dangerous Drugs and Pharmacy Act. Dr. W. G. Dixon of Cambridge, our foremost pharmacologist, has written to the *London Times* protesting against this amendment, which it is feared will curtail the doctor's right and privileges and not be effective. Dr. Dixon points out that in 1910 it was estimated that the consumption of morphine per head per annum in Austria was about one half grain; in Germany two grains; France, three grains; and the United States, thirty-six grains. Evidence of this nature led the United States, in December, 1914, to adopt what has come to be known as the Harrison Narcotic Law, which had the support both of the public and of the medical profession. In effect, this law dictates the manner of practising medicine and involves many irksome details and much clerical work for the doctor. It necessitates an army of officials—Federal, State, county and city—and every grain of narcotic must be traceable. Dr. Dixon proceeds to say that this law has now been actively enforced for seven years, and it is the universal opinion of those best able to judge that it has signally failed in its purpose. According to the estimates of Dr. Dixon, or rather those which have been given to him, the number of addicts and the amount of narcotics consumed are as great as or greater than in 1915. The Committee of the United States Treasury in 1921 figure that the country contained at least, one million addicts.

Dr. Dixon believes that the main reason for this is to be found in the fact that the law takes no account of the causes of addiction: the drug victim is regarded as a criminal, just as the insane were in medieval times. He states as if from intimate knowledge, that everything can be obtained if the price is commensurate with the risk, with the result that smuggling is rampant from end to end of America. Distribution is organized through underground channels, through underground dope peddlars. In other words he points out that the law has not diminished the supply, but only the distribution of the supply. The writer believes that it is the considered opinion of medical experts that the drug addict is a psychopath before ever he becomes addicted: that the ordinary normal man is as unlikely with every facility at hand, to become an addict of morphine or cocaine as he is to become a drunkard. These people take to narcotics just as they do to most other things which are foolish and wrong: addiction is a symptom of disordered mind, and simple custodial care with the withdrawal of the drug is no cure.

The British law, somewhat less drastic than the American law, came into force in September, 1921, and it is too early yet to see its effect. But Dr. Dixon pertinently says that we do not seem to have learned anything from the experience of our American brethren, since, in the amending bill to the Dangerous Drugs' Act now in the committee stage of the House of Commons, the medical profession is subjected to a number of pinpricks. He inquires whether our legislators cannot understand that the only hope of stamping out drug addiction is through the doctors, that legislation above the doctors' heads is likely to prove our undoing, and that addiction can be no more stamped out by prohibition than insanity can be stamped out. Yet in the amending bill practitioners not in actual practice are, in effect, forbidden to purchase narcotic drugs. Every practitioner is in practice, but in this case the "actual" is likely to be interpreted as "for gain." Registration under the Medical Act has up to now given certain rights; but registered doctors are now to be divided into two groups, and from one of these rights are to be taken away. The doctor is no longer allowed to prescribe for himself, and is to be subjected to horrible penalties for any infringements. In short, Dr. Dixon holds the view strongly that there can be little doubt that the passage of the amending bill, as it stands, will do positive harm. It will cause intense resentment in the medical profession.

It may be remarked that the medical man here is having his privileges, and many of his rights, curtailed. The introduction of insurance practice, known as panel practice, has had, to some extent, that effect, that is, he is liable, if he is a panel practitioner, and the majority of general practitioners take insurance practice, he is more or less under the thumb of the approved societies and seems likely to be more under their domination. The approved societies think no doubt that if they pay the piper they ought to choose the tune. The fact is that here medical men like the farmers and agriculturists generally have no power politically and they must endure whatever treatment those who hold the political power wish to mete out to them.

COCAINE AND ITS SUBSTITUTE.

Cocaine is the drug chiefly in favor here and, therefore, it is good news that a substitute for this drug in dental and eye work and minor surgery is reported to have been discovered in Chicago. This substitute has been mentioned favorably by Dr. C. W. Saleeby who has been traveling recently in America and Canada and is especially enthusiastic concerning it because then cocaine can be eliminated as a drug and will not have to be imported to this country for local anesthetic purposes. Dr. W. M. Beaumont wrote highly of this substitute a few weeks ago in the *British Medical Journal* and it is also stated that it has proved equally valuable in the hands of dentists. It is emphasized that this product has no attraction for the drug taker, it is not a derivative of cocaine and thus can be prescribed without restriction.

PANEL PRACTICE.

As hinted in a previous part of this letter, insurance practice has a considerable number of drawbacks from the point of view of both the practitioner and the patient. As said before, the Approved Societies have been called upon to make further contributions from their funds towards the cost of medical treatment and later on will be asked for still further contributions and they desire to have a voice and a voice that will be heeded, in the manner in which panel doctors conduct their practices. At the present time the medical profession will not meet the approved societies to discuss future terms but prefer to deal direct with the Minister of Health. The Minister of Health has given an indication to the approved societies that he will not conclude any arrangement without first consulting them. It seems, therefore, that the most fitting procedure would be to call for a conference, which should be attended by officers of the Health Department, representatives of the insurance practitioners and of the approved societies. There are complaints on both sides, which might be best settled by free and open discussion. As for the important question of treatment of the wives and families of insured persons, this must remain in abeyance on financial grounds. This question, indeed, especially that part of it which includes provision of surgical operations and matters of the kind, is largely bound up with the hospital question, and the hospitals to a great extent are solving this problem on their own account. It must be taken into consideration that a large number of British citizens at the present time are making contributions to the hospitals and very many of them are becoming paying patients. But, and this is a most important point, the exact position of the hospital in the medical service and the national insurance scheme has yet to be determined.

Book Reviews

HEART DISEASE.

Diseases of the Heart. By John Cowan, D.SC., M.D., F.R.F.P.S. and W. T. Ritchie, O.B.E., M.D., F.R.C.P. E., F.R.S.E. Second Edition. London: Edward Arnold & Co., 1922.

Although described as a second edition, this is virtually a new book. Many of the chapters are entirely new, while the remainder have been revised extensively. The opening chapters deal adequately with the recent anatomical and physiological work and with the pathology of the myocardium. There follow chapters on the examination of the heart; the irregularities; acute endocarditis; chronic valvular and myocardial disease; angina pectoris, disordered action of the heart, "D. A. H."; pericarditis; congenital disease of the heart; the diseases of the arteries and aneurysm of the aorta. There is a short chapter on the ocular manifestations of arterial disease, contributed by A. J. Ballantyne. The illustrations, for the most part original, are numerous and well selected.

The chapter headings are not always fortunately chosen. Thus, chapter IV, entitled The Examination of the Heart, considers only the polygraphic and electrocardiographic methods. The methods of physical examination are not stressed and very little attention is given to röntgen ray interpretations. Since the book is adapted particularly for practitioners and students, this is unfortunate. In a number of chapters certain important matters are omitted or given too brief attention. Thus, in the chapter on angina pectoris, no mention is made of the clear cut clinical picture in patients with sudden closure of a coronary artery. In the discussion of acute endocarditis, the subacute bacterial form is dismissed with a few sketchy remarks.

As a general presentation of the subject of cardiovascular diseases the book serves its purpose very well; it is complete but not comprehensive. A more detailed bibliography would greatly add to its value. More attention might perhaps have been paid to the historical aspects of the subject. The book is not a comprehensive treatise on cardiovascular diseases. It may, however, be recommended as an accurate and fairly detailed account of the important diseases of the heart.

SOCIAL ASPECTS OF SYPHILIS

Syphilis of the Innocent. A study of the Social Effects of Syphilis on the Family and the Community, with 152 Illustrative Cases. Made under a grant from the U. S. Interdepartmental Social Hygiene Board, by Harry C. Solomon, B.S., M.D., and Maida Herman Solomon, A.B., B.S. Washington, D. C.: U. S. Interdepartmental Social Hygiene Board, 1922.

The authors have made the praiseworthy and highly important attempt to present the subject of syphilis in its social aspects, portraying the practical problems as they actually arise in the handling of syphilitic cases and illustrating the text freely with cases from the clinic. In this attempt it would appear they have succeeded most admirably. They have produced a volume of exceptional interest, not only to the physician, but to the lay social worker and student, who comes in contact with the byproducts of syphilis in the form of mental and physical deterioration and inferiority. Exception should be taken to the unusual and altogether unnecessary use of patients' names in connection with the report of their cases. We cannot see that anything can be gained by using such distinctive names as Etta Prince, Howard Lincoln, Sarkis Sculos or Bertram Wood, in connection with their disease. It seems to the reviewer that the authors have violated the professional privilege, which should be respected inviolably as regards the clinical patient and the private patient alike.

The authors' conception of syphilis is up to date, clearly stated and manifestly based on a large clinical and sociological experience. They are to be congratulated on the result of their efforts.

SYMPTOMS

Klinische Symptomatologie innerer Krankheiten. Von Hofrat Prof. Dr. Norbe Ortner. Vorstand d. II med. Klinik der Univeresität Wien. Erster Band. Zweite Teil. Körperschmerzen (mit Ausnahme der Bauschschmergen). Second Edition. Price 240 marks. Berlin and Vienne: Urban & Schwarzenberg, 1922.

The first edition of this volume appeared in 1919 and has already been translated into English. According to the preface there was but little to add to the first edition. The various localities subject to pains considered in the book are cardiac region, loins, coccygeal region, shoulders, back, chest, extremities, musculature in general, bones, joints ,and head. A great drawback in a book on painful affections and pain is the total absence of illustrations.

PSYCHOANALYSIS WITHOUT SEX

Conflict and Dream. By W. H. R. Rivers. New York: Harcourt, Brace & Howe, 1923.

At last we have it. Psychoanalysis sans sex. Psychoanalysis with sails trimmed so as to appeal to any homosexual who wishes to believe that homosexuality is not sexuality, that homosexuality really is nothing but a myth. He gives dreams and shows, to his own satisfaction at least, that there is nothing sexual in them. Any tyro in dream interpretation would not be satisfied with the obvious avoidance of the fundamental material which is clearly apparent. The whole thing is clearly an attempted avoidance of fact and truth. No doubt personal affective states were responsible. All this could be forgiven but when an attempt is made to align himself with Freud and patronizingly link himself with him—this seems a bit thick. Even this, however, could be overlooked. The one thing that strikes the reader as pompous, arrogant, in bad taste and crude to the degree of causing an actual feeling of disgust is the banal attitude shown by T. Elliott Smith in his introduction. He takes it upon himself to interpret Rivers according to his own fantastic lights and on top of this states that Rivers really did not mean what he said about myths and other subjects. The text as written by Rivers is bad enough but with Elliott Smith's ludicrous annotations it becomes impossible.

DISEASES OF WOMEN

Die Pathologisch-anatomischen Grundlagen der Frauenkrankheiten. 24 Fortbildungsvorträge aus dem Gesamtgebiet der Gynäkologie. Von Prof. Dr. Wilhelm Lahm. Dresden und Leipzig: Verlag von Theodor Steinkopff, 1923. Pp. 301.

The twenty-four lectures given in a postgraduate course at the Staatliche Frauenklinik, Dresden, are reproduced in book form in response to a request for their publication. The author endeavors to make the abstract, lifeless, colorless and theoretical subject of pathological anatomy the fundamental basis of thorough clinical science and also the intermediary between the changes in the anatomical substrate and the visible vital phenomena; from there the way to symptomatology, exact and well founded diagnosis and the proper therapy is easy. The work is aided by valuable illustrations, models, etc., from the clinic.

The first chapter deals with the general pathological anatomy of inflammation, neoplasms and malformations. In the subsequent chapters, the five cardinal symptoms of fluor, hemorrhages, pain, amenorrhea, dysmenorrhea, and pressure symptoms (as evidenced by abdominal distention and difficult urination and defecation) form the framework upon which the structure of gynecological study is built up. A number of tables are added to aid the memory. The physician is advised to consider disease from the pathological anatomical viewpoint in every case; this naturally leads to a clear diagnosis, an etiological and rational therapy and correct prognosis.

This little book ought to be in the hands of every German reading physician interested in gynecology. It is a departure from the usual type of textbook on gynecology in that it treats the subject in an entirely rational manner and not in the usual humdrum sequence of etiology, pathology, diagnosis, prognosis and treatment.

VITAL STATISTICS

Vital Statistics; An Introduction to the Science of Demography. By George Chandler Whipple. Second Edition. New York: John Wiley & Sons, 1923. Pp. 579.

The book was planned by the author as a textbook for the study of demography, or the science of vital statistics. It was written especially for students who are preparing themselves to be public health officials, and for public health officials who wish a more detailed and recent exposition of statistical forms and methods. The book explains what statistics are, and what they are not; it teaches how to express vital facts through figures, their tabulation and their diagrammatic display; how to compute birth and death rates, and how to analyze the latter; how to adjust and standardize death rates, and how to make life tables; it shows how we may use vital statistics with "truth, imagination and power." The general arrangement of the book is rather an informal one, and the illustrations have not been gathered according to any specified system, but the principles of the statistical method are set forth in a clear, simple, and orderly manner.

In this second edition, the material has been revised on the basis of the census tables of 1920, which had not been published when the first edition was issued. There is also a new chapter on the estimation of future population of cities, including diagrams showing population growth in various parts of the United States. The international list of the causes of death has been revised in accordance with changes made by the Congress of Paris in 1920. There are several appendices: 1, References; 2, Model State Law for Morbidity Reports; 3, Law for the Registration of Births and Deaths; and, 4, Tables of Logarithms of Numbers.

DYNAMIC PSYCHOLOGY

Problems in Dynamic Psychology. By John T. MacCurdy, M.D. New York: Macmillan Company, 1922.

MacCurdy's book resembles the old adage of the temperamental month of March about coming in like a lion and going out like a lamb. He begins with a critic of psychoanalysis in which he promises many things and where one feels he is going to destroy some of the props of Freud's theory. He really supports these socalled untenable positions by his own reasonings. On the whole he deals more severely, perhaps unwittingly, with some of the narrower critics of psychoanalysis, such as Rivers, than with the fundamental Freudians.

However this may be, his final formulations are interesting in the extreme and show painstaking labor. Opponents of psychoanalysis will welcome the book, until they have carefully read it. Orthodox psychoanalysts will find it not to their liking until they have finished it. The book promises more than it gives and gives more than it promises.

STUDENT'S HANDBOOK OF SURGERY

Lehmanns medizinische Handatlanten. Band XXXIX. Grundriss und Atlas der allgemeinen Chirurgie. Von Professor Dr. Georg Marwedel. Zweite vermehrte und verbeserte Auflage. Mit 32 farbigigen und 201 schwarzen Abbildungen. München: J. F. Lehmanns Verlag, 1923. Pp. viii-454.

The author has attempted to steer a middle course between the elaborate textbook on surgery and the ordinary compend, so as to make it a handbook for the student who is just beginning to observe patients in the surgical ward or on the operating table. For the physician already in practice it is intended to serve as an aid in rapidly acquiring the newer teachings and advances in surgery, especially in the field of surgical bacteriology. The arrangement of the work is that which the author followed in his lectures as dozent at the Heidelberg University. The illustrations are numerous—both colored and in black—and were taken from actual cases at the Heidelberg Surgical Clinic; some of them were also taken from various well known atlases published previously. In this second edition the work has been thoroughly revised and it also includes many new chapters, such as those on wound dressings, cauterization and chemicals, wound diphtheria, blastotrichoses and sporotrichoses, echinococcus and cysticercus, diseases of wounds caused by animal toxins, and particularly, gas bacillus edema. The final chapter includes important surgical diseases of various tissues, which cannot be accurately classified. The striking illustrations of gas bacillus edema, which were taken directly at the front during the World War, deserve special mention.

HISTOLOGICAL TECHNIC

Handbuch der biologischen Arbeitsmethoden. Unter Mitarbeit von über 400 bedeutenden Fachmännern herausgegeben von Geh. Med.-Rat Prof. Dr. Emil Abderhalden. Abt. VIII, Methoden der experimentell morphologischen Pathologie, Heft 1. Allgemeine Methoden. G. Herxheimer-Wiesbaden: Histologische Technik. Berlin and Wien: Urban & Schwarzenberg, 1921. Pp. 336.

This is an intensely practical reference book dealing with the minutest details of every branch of histological technic. It constitutes Part VIII of a large series of handbooks on biological technical methods and the general methods of experimental morphological pathology. It includes a description of general microscopic technic, a description of the various instruments required, the examination and preparation of microscopical specimens, a description of the methods of fixation and hardening of histologic specimens, decalcification, the methods of freezing specimens and the methods of staining. The ingredients and the methods of preparing all stains are given. This book is most valuable to the laboratory technician and leaves little to be desired in regard to detail and completeness. It is a pity that an index has been omitted, as in a reference book such as this it is indispensable.

PHYSICAL DIAGNOSIS

Inspection, Palpation, Percussion, Auscultation. Leur pratique en Clinique Medicale. Third Edition. Par M. Maurice Letulle, Professor à la Faculté, Membre de l'Academie de Medecine. With 133 illustrations and 12 radiographic plates. Paris: Masson et Cie, 1922, pp. 337.

The book contains a graphic description of the various technical maneuvres which should form the fundamental training of every student of medicine. Each of the procedures of inspection, palpation, percussion and auscultation, as applied to the different regions of the body, are presented. The 133 illustrations of the book demonstrate the position of choice both of the patient and doctor in the examination, as well as the method of approach of the physician. The text, which precedes and accompanies every figure, gives concise suggestions in connection with each technical procedure. This is the third edition of the manual, which differs from the preceding ones by the addition of twelve good radiographic pictures with text emphasizing the importance of this adjunct to physical diagnosis. The volume should be of real value to medical students.

SYPHILIS OF THE NERVOUS SYSTEM

Die Syphilis des Zentralnervensystems. Ihre Ursachen und Behandlung. By Dr. Wilhelm Gennerich, Kiel. Zweite durchgesehene und ergänzte Auflage. Mit 7 Abbildungen. Berlin: Julius Springer, 1922. Pp. vii-295.

Gennerich gives a very complete survey of syphilis of the nervous system in all its manifestations He has discussed with great clearness the important intervening stage between primary syphilis and its development in the central nervous system, namely, the meningeal infection, the meningoencephalitis serosa infectiosa, through which alone the later developments come about. He urges carefully considered use of the means which the advance of knowledge puts into the clinician's hands. There is danger that specific treatment of early syphilis will so interfere with the natural allergy of the body that conditions are only made more favorable for the spread into the meninges and through them of the infection. The future fate of the central nervous system in regard to syphilis lies, therefore, largely in the physician's hands. One may not be in strict agreement with the writer in his theory or technic, yet his full presentation of the subject and the possibilities for good or for all of specific treatment, is invaluable for that advance of knowledge and thoughtful use of technical means for which he pleads.

MILITARY MEDICINE

Notes On The History of Military Medicine. By Lieut. Col. Fielding H. Garrison, Medical Corps, U. S. A. Reprinted from *The Military Surgeon,* Washington, Association of Military Surgeons, 1922.

An interesting outline of the history of military medicine has been furnished by Lieutenant Colonel Garrison, who was well fitted to profit by the opportunities afforded him to study military history when he was placed in command of the division of the medical and surgical history of the war in the surgeon general's office during the World War.

Colonel Garrison is well known to the student of medical history through his admirable volume *The History of Medicine* and his broad knowledge of the subject has enabled him to present within the two hundred pages of the *Notes on the History of Military Medicine,* an excellent conspectus of the principal points under this topic from the times of ancient Greek to and including the World War. The reader will, however, be possibly a little disappointed that so small a proportion of the volume, about sixteen pages, is devoted to the World War, for the author undoubtedly is in position to give us a comprehensive and informing volume on this latter subject.

CLIPPED WINGS

Quest. By Helen R. Hull. New York: Macmillan Company, 1923.

Gates of Life. By Edwin Björkman. New York: Alfred A. Knopf, 1923.

Reminiscences of childhood are coming to the fore. With Björkman's *Soul of a Child,* the peak was reached as far as the psychology of the adolescent boy is concerned. A girl is submitted to somewhat the same searchings in *Quest.* If anyone can doubt the criminal wrong done children in bringing them up under conditions of disharmony, strife, and petty bickering, this book should open his eyes. Like little Jean in the story it starts out to be a great book. One can see the child mind being whittled away, warped, contaminated, and thus the book progresses until it peters out tediously with Jean still seeking what she will never find without a thorough psychoanalysis—the self of which there was so much promise, now huddled into every day mediocrity.

The same fate has met Björkman's continuation of the *Soul of a Child.* Only in this case the family conditions were more morbid and the outcome more clearly inevitable from the start. The youth realizes the swaddling link with the mother, the mother country; he, finally, after many struggles to continue his home existence and yet steal some independence, makes the decisive break and is about to set out for America. Probably a further volume will set him on his feet, and reveal the man in him at last.

It is interesting to note how many Scandinavian writers have undergone the same weaning process, and only in flight have achieved their potentialities. The picture of Swedish growth and development, of the baffled stirrings of modernism and the fierce youth of the country with its bitter protest against mediocrity, convention, muddleheadedness, against the very country that had raised them to no greater heights than these commonplaces they decry, gives the book its real value. As far as Keith Wellander's young manhood is concerned, he becomes at best only a sympathetic mouthpiece of the universal experience.

INFLUENCE OF THE FRENCH MASTERS

Degeneration in the Great French Masters. By Jean Carrère. New York: Brentano's, 1922.

The method of attack used by Carrère is a valuable one. His psychology is good but some doubt is cast on his deductions by the questionable choice of material with which he has attempted to prove his generalizations. He attempts to show that the introversion of certain French authors is a recessive or regressive trait which he labels as degeneration. He postulates that the value of writing is not in the beauty of expression but in its relationship to adult constructive tendencies. So far so good. The only unfortunate thing about his thesis is his own inability to judge. He is apparently blinded by his own affects, the very thing he holds against the men whom he criticizes. There are two possibilities: first, that he is unable to see beyond the text, as one would judge from his attitude toward Zola and Stendhal, and, second, that he cares little about the distinction between phantasy and reality. He also overestimates the influence of the various writers he reviews. It would be well if he would give heed to some of the works on the psychology of the herd as outlined by Le Bon, Trotter and Freud in some of his recent works. Then he could see the relationship of identification, rationalization and expression of personal opinions.

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Medicoliterary Notes.

Medical supplies are so scarce in many parts of Russia that in one town the price of six capsules of quinine is one dollar and fifty cents in gold, and a single antiseptic tablet costs twenty cents.

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Thomas Hunt Morgan, professor of experimental zoology at Columbia University, has recently published a monograph entitled Some Possible Bearings of Genetics on Pathology. Professor Morgan warns the experimenter against the danger, in his enthusiasm for applying the Mendelian laws, of premature conclusions drawn from insufficient evidence.

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Dr. Frankwood E. Williams, Director of the National Committee for Mental Hygiene, has an article in the *Modern Hospital* for February on Mental Hygiene in 1922.

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The Bursum Bill, affecting the ownership of land and the deciding of civil disputes by the Pueblo Indians, has aroused much interest in the Red man throughout the country, as is shown by the fact that a large number of leading periodicals have recently had articles, either on the problem of the bill itself, or about the Pueblos. Among these are the Dance Rituals of the Pueblo Indians, by Alice C. Henderson, in the April *Theatre Arts Magazine,* and What Is to Become of the Pueblo Indian? by Alida Sims Malkus, in *McClure's* for April.

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A recent amusing and cleverly satirical publication is the *Rise and Fall of Prohibition,* by Charles Hanson Towne. The illustrations are by Peter Newell. Macmillan is the publisher.

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Several of the large Parisian department stores, among them the Galèries Lafayette and the Louvre, have well equipped, successfully operated day nurseries for the babies of employees. Their purpose is to demonstrate that work for married women is not incompatible with motherhood. Each mother receives at the time of her confinement two months' leave of absence with full salary, and returns to work, bringing her baby with her. These mothers may arrive a half hour later, and leave a half hour earlier than other employees. The only condition of admission to the nursery is that the mothers nurse their babies. In order to do this, the mothers are permitted to leave their work every three hours.

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Prof. M. V. O'Shea, of the department of education of the University of Wisconsin, is the author of a recently published volume on *Tobacco and Mental Efficiency.* The discussion of the subject is unprejudiced, and based on personal testimony, laboratory experiments, and psychological tests.

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A comprehensive study of the Epidemiology of Botulism has recently been issued as *Public Health Bulletin No. 127* of the United States Public Health Service. The authors are Dr. J. C. Geiger, Dr. E. C. Dickson, and Dr. K. F. Meyer.

* * *

Human Life, How It May Be Prolonged to 120 Years, is the title of a book recently issued by Knopf. The author is Col. F. F. McCabe, of the British Army Medical Corps, whose great success in establishing and carrying out health and efficiency methods for the men in his charge during the war are well known to medical men in this country.

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The *Report of the British Medical Research Council* for the year 1921-1922 discusses the work of the National Institute for Medical Research; experimental medicine and the research work of clinical units; industrial medicine and industrial fatigue; and research in specific subjects, among them, child problems, mental disorders, epidemiology, radiology and radiotherapy, and various specific diseases of significance in public health problems.

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James Bissett Pratt, in his article, Religion and the Younger Generation, in the *Yale Review* for April, makes a plea for acceptance of the modern attitude toward religion as a step toward the working out of a faith that can be supported and substantiated by science. "That Christendom will ever return to the old creeds and to the old attitude to the letter of the Scripture is out of the question—our Fundamentalist friends may as well make up their minds to that once for all."

Practical Therapeutics

MEDICINAL TREATMENT OF HIGH BLOOD PRESSURE

By Charles Greene Cumston, M. D.,

Geneva, Switzerland.

To treat high blood pressure without treating the cause will clearly result in complete failure. In point of fact, it is rather singular to regard—as some do—arterial hypertension as a kind of morbid entity, when in reality it is a symptom of numerous very dissimilar pathological states, frequently having no relationship to one another. They are only related by the common fact that they end with temporary or permanent high blood pressure. Hence, it ensues —and this cannot be denied—that there is no treatment of arterial hypertension *per se,* but only treatment of those conditions giving rise to it.

For example, take a plethoric subject, a large eater and a heavy drinker; the plethora keeps up high blood pressure and all the usual hypotensive drugs will have no effect and are in reality contraindicated. This is an instance in which the frequent exhibition of laxatives and a reduction in the amount of food and drink will reduce the blood pressure.

King Louis XIV was in the habit of getting up in the night to eat a cold partridge and a pheasant, and during the day conducted himself royally at table as well. The august monarch would probably have died from the results of high blood pressure if his physicians—who were far more circumspect than the average physician of our day—had not ordered an average of five enemata in twenty-four hours, not counting the administration of laxatives. Quite unwittingly, the physicians of Molière's time often dealt with arterial hypertension much more efficaciously than do our enlightened practitioners at present.

However, we will not consider the methods in use for lowering the blood pressure in general and shall only consider those medicaments which have proved themselves to be vasodilators, viz., the nitrites, benzyl benzoate, and sodium citrate. Among the nitrites, trinitrin and sodium nitrite are most commonly employed, but it must not be forgotten that they may depress the heart. A keratin coated pill containing sodium nitrate, five centigrams, and extract of mistletoe, seven centigrams, is useful, three to be taken daily. The nitrite is liberated in the intestine.

Benzyl benzoate is given in doses of twenty drops in a five per cent. alcoholic solution nine times in twenty-four hours, but larger doses may be exhibited without any untoward effects. The hypotensive action of this drug is manifest. When injected into dogs a marked vasodilatation results in the domain of the splanchnic nerves, resulting in a lowering of the blood pressure. The drug may be given hypodermically in an oily solution containing from two to four drops in each cubic centimetre of olive oil.

Sodium citrate is prescribed in potion in doses of from three to ten grams in twenty-four hours. It must be exhibited for some time, and is more particularly indicated in plethoric subjects with hyperviscosity of the blood.

Tincture of garlic requires great precision in its use, because it should be prepared by a maceration of equal parts of hulled clove of garlic and water. The daily dose is from twenty to thirty drops taken at one dose and the drug should not be exhibited for more than two to four days at a time with an interval of five days. Prolonged exhibition results in arterial hypertension on account of the tonic effect on the heart.

But the best treatment of arterial hypertension is that which deals with the etiological factor. One of the most frequent causes is arterial atheroma and as we now know that arteriosclerosis and atheroma are unquestionably the result of cholesterin deposits in the bloodvessels, it follows that the only way to deal with this condition is to dissolve these deposits. This can be done with the alkaline phosphates, or, better still, with organic phosphatides, which dissolve the cholesterin. Their exhibition during two or three months generally lowers the blood pressure, and when this is once obtained the result is permanent, a result unattainable with the other hypotensive drugs, their action in this respect being only ephemeral.

NAUHEIM TREATMENT OF HEART DISEASE

By Louis Faugeres Bishop, M. D., Sc. D.,

New York,

Formerly Professor of Heart and Circulatory Diseases, Fordham University Medical College, N. Y. City; Physician to the Lincoln Hospital, N. Y. City.

The time has come when we are again in contact with people who have been to Bad Nauheim for a course of treatment, and any report from them as to conditions there has certain value. It has seemed to me that those who have remained long enough to take a satisfactory cure have been really benefitted. From a purely technical view of the matter, and omitting all political considerations, it must be acknowledged that no cure resort has replaced Bad Nauheim in its beneficial influence on cardiac disease. The reasons for this are not so easy to analyze as might be supposed; nevertheless, at the present time the Bad Nauheim treatment represents a concentration of experience in dealing with cardiopathic individuals that cannot be duplicated elsewhere in the world. There still remain a number of physicians whose experience dates from well before the war and who have resumed work, although, of course, some of the older ones are missing.

Nauheim methods must be considered as a whole, and I have even gone so far as to state on one occasion that even if the baths were omitted and the other elements of the cure were attended to, it would be a helpful place to send patients for a cure. I believe that in the Bad Nauheim surroundings the Nauheim bath has a definite usefulness and curative value, but the real cure is the result of a large collection of people, each having the same medical problem, who are congregated together under the care of a group of physicians. These men have had every chance to make every possible blunder in the management of heart disease, and who have profited by their experience.

One valuable fact they have learned is the absolute necessity of a general physical regeneration in persons with heart disease, as opposed to the fallacy of degeneration that results from the abuse of the almost universal rest cure. They have learned the importance of maintaining the hopeful attitude and the avoidance as far as possible of invalidism. They have learned that though the fatal outcome of cardiac disease is a fact, in many instances, nevertheless, it must be as little as possible brought to the notice of heart sufferers. How conditions are now at Bad Nauheim, I do not know, but in former years, under the strict Prussian government, no public funeral was allowed, and dissemination of the knowledge that a death had occurred at the cure was forbidden. The depressing effect on the guests of such a reminder of their peril was thus avoided.

The reason that the cure at Nauheim succeeds better than a spa treatment taken in America or elsewhere, is because the details are carried out in a different spirit, that is, a painstaking and laborious effort is made to impose a suitable regimen and its accessories in every minute particular. Americans in their own country do not take the time, or have the patience to submit to the instructions as to diet and exercise, which form such an important feature of the cure. They want to be cured in spite of themselves and expect the physician to remove the disease without any contributory effort on their own part. Another reason for failure is that these resorts in America are not popular as vacation resorts, and the frequenters of the spa go merely with the idea of getting through with a disagreeable task. This is entirely in opposition to the restful and leisurely atmosphere required if benefit is to be obtained.

The German word *Kur* carries an entirely different signification from our word cure. Our understanding of "cure" is that the disease is removed. In Germany, and in Europe in general, it may be said that "taking a cure" signifies that the patient, by means of rest, exercise, diet, and suitable treatment, is endeavoring to reconstruct his vitality and his energies, so that his disease, if not removed, is held at bay and his life and wellbeing prolonged. A very sensible European custom is to make a vacation by taking a cure, so that one returns to work and ordinary life greatly strengthened and benefitted in health. In this country a vacation often means a crowded rush, under conditions of hurry and discomfort that one would not tolerate in one's own home. The return from such a vacation often finds the patient in more need of rest than when he started.

Americans, especially those past middle life, could learn a valuable lesson from Europeans in this respect. They should give up a certain time every year in which to put themselves into the best possible condition. They should, during vacation, put in the "stitch in time" which will stand them in very good stead in their latter years.

If we examine the general method followed at Nauheim, we shall see some of the reasons why the *Kur* is so managed that it procures a reconstructive result. A patient who arrives at Nauheim is at once deprived of all customary drugs, and only allowed those which may later be deemed in harmony with the treatment. The question of rest is made one of the first essentials. The Nauheim air is one tending to produce drowsiness. Patients sleep better than usual there. Another factor which tends to produce this result is that the coffee used is always a kind from which caffeine has been abstracted, so that patients take their coffee without imbibing stimulant. Healthful sleep is not disturbed.

Another important essential is exercise: The little town is pleasantly laid out with shady walks and flower beds. The band plays in the afternoon, and patients can step easily out on the walks and are persuaded to take easy exercise almost without knowing it. Quite naturally they acquire the habit of spending most of the time in the open air. The fresh air life and mild exercise stimulate the nervous system and aid appetite.

In regard to the nourishment of the patient, a great point is made at Nauheim of nourishing and appetizing cooking. Meals are not heavy nor rich. The dishes are all freshly prepared; no madeover dishes are served. A practice is made of serving the meals deliberately, with waits between the courses, so that the feeling of bolting one's food in a hurry is done away with. There are plenty of dishes, consisting of light, plain food, in moderate portions, and as this is eaten slowly the appetite is satisfied, without a great quantity being consumed. In fine weather meals are served out of doors, and the band plays meanwhile, which all adds to the plan of making the meal a pleasant and restful proceeding, not the hurried effort to cram down enough food that it often is in our country.

One must not neglect to mention the upholding of a certain morale, which is indeed part of the essential spirit of the place. The whole regimen is so organized that patients are encouraged to feel they are going to get well. The psychology of optimism is induced to the utmost, as it is realized that the optimistic attitude is of extreme importance to the cardiac patient. For many of those who go to Nauheim, perhaps, the handwriting is on the wall, but in spirit of this all are encouraged in the hopeful outlook and when death intervenes, as it inevitably must, in some cases, publicity is avoided and the topic is kept from the other patients.

In spite of the fact that we believe all these details to be an important part of the sum total of good gained by the Nauheim cure, one cannot pass over the baths themselves as an unimportant feature. These provide the guests with a certain definite purpose, and apart from their therapeutic effect, make him think he is entering into a scheme for his own improvement and this has its psychological value. Even the matter of the baths, however, is not pushed too strenuously; the patient has certain rest days, when he does not take baths or any other treatment, thus gaining intervals of relaxation and the feeling of not being obliged to do anything.

The bath itself consists of a strong brine solution, with a considerable amount of calcium chloride, and a certain proportion of carbonic acid gas. The strength of the brine solution is an important point.

In taking the bath, the patient lies in the water for a certain number of minutes. The water is at first warm, but as the course progresses, the solution is made cooler and stronger. On account of the natural amount of salt and the carbonic gas saturation of the water, the patient is able to take the baths much cooler than he ordinarily would be able, and the effect on the heart is greatly enhanced.

A helpful type of exercise that is used in conjunction with the bath treatment is the resistance exercise. It has to be carried out with the help of an attendant, who gently resists the series of motions on the part of the patient, which are so designed as to include all the body muscles. In this way the tonicity of the muscles is improved and maintained.

It may be said here that there is nothing in the simple plan outlined as the essential Nauheim treatment which could not be achieved in America, with as good results. It is just because of its simplicity that the atmosphere of Nauheim is so difficult to reproduce in the artificial and overstrained conditions under which we exist. Good air, plain diet, rest, mild exercise, baths, are all obtainable, but the general management and psychological control of the patients by the physician or group of physicians are extremely hard to reproduce. In other words, the spirit of the Nauheim treatment has brought it to the point of a fine art. Results are gained by the reconstruction of the mental, physical and moral tone of the patient.

Some Aspects of Cardiac Disease.—John Hay (*British Medical Journal,* July 22, 1922) says that irregular heart action is not merely a matter of degree, that there are also several varieties, differing in type and in their significance. Auricular fibrillation is a sharply defined condition, recognizable without any special apparatus. The clinical picture may vary; usually the onset is sudden, the patient being conscious of the time of its onset, or it may develop insidiously; the ventricular action is completely irregular, but the rate may vary and often the rate of ventricular contraction is greater than the pulse rate; the rapid and relatively inefficient action of the ventricles increases the liability to cardiac failure and if the myocardium is unsound, or if there is marked arterial hypertension, the onset of cardiac failure is rapid and the distress is great (delirium cordis); dilatation of the heart is the result and not the cause of the rapid and disorderly action of the heart.

The etiology may be either, 1, rheumatic, commonest in mitral stenosis and during the age of twenty to fifty years, or, 2, senile, mostly in males and associated with myocardial degeneration, arteriosclerosis and chronic interstitial nephritis. Fibrillation may occur in any type of cardiac lesion, the fundamental change being the activity of the auricles —continued diastole and the presystolic contraction of the auricle disappears, as shown by the electrocardiograph and in the phlebogram. The auriculoventricular bundle loses its power of controlling the transmission of the impulses to the ventricle, and the ventricular action becomes disorderly.

The diagnosis is made by the history, the change in the character of the murmur and especially by the specific character of the arrhythmia, aided by the palpation of the pulse (haphazard beats); another diagnostic feature is the response to the digitalis group of drugs with a marked slowing of the ventricular rate and the appearance of coupled beats. It must be differentiated from sinus arrhythmia and heart block by the polygraphic and electrocardiograph records.

The therapeutic indication is to reduce the ventricular contractions to normal limits. In very urgent cases, 0.5 to 1.0 mg., strophanthine is given intravenously. In less urgent cases, full doses of tincture of digitalis, beginning with 1.0 or 1.5 drams (preceded by a purge) are given, or twenty minim doses may be given three or four times daily until the ventricular rate has reached 70 to 80; the digitalis should then be continued until sufficient digitalis is being taken to maintain this speed. The indications for stopping digitalis are: 1, a ventricular rate of 70 or lower; 2, nausea, vomiting, or diarrhea; and, 3, a coupled beat. If the tincture is not tolerated, Nativelle's digitalin granules or the tincture of strophanthus may be tried.

Auricular fibrillation can be terminated in fifty per cent. of the cases with quinidine sulphate, but the fibrillation often recurs and the administration of this drug is not without danger. When it is given, the auricular and ventricular contractions in the electrocardiogram should be carefully watched twice daily. Quinidine sulphate is given in capsules in ten doses of 0.2 gm. in twenty-four hours. It should not be given indiscriminately and the patient should be watched continuously.

Action of Quinidine in a Case of Complete Arrhythmia With Large Goitre.—E. Benhamon (*Paris médical,* March 10, 1923) reports the case of a woman aged forty-five in whom the menopause was soon followed by attacks of paroxysmal tachycardia of increasing frequency. They finally became practically continuous, with constant painful palpitation and dyspnea which precluded all bodily movement. The patient had had a small goitre for some time, but with the first attack of tachycardia it suddenly became much larger, and later was turgescent and pulsating. When first seen the patient had an extremely frequent and irregular heart action, with enlarged heart and liver râles at the bases of the lungs, edema, oliguria, and paroxysmal dyspnea. The pulsations in the goitre were as distressing to the patient as her heart action. Under digitalis diuresis occurred, the râles yielded, and dyspnea was reduced, but the arrhythmia and cardiac discomfort remained. Three tablets a day of 0.2 gram of quinidine sulphate were then prescribed, with the result that on the second day the pulse was reduced to 80 and definitely regular. The systolic and diastolic pressures were both reduced by 20 mm. of mercury. When the quinidine was interrupted for three days, two attacks of tachycardia recurred. A single attack took place after resumption of quinidine, and thereafter the patient remained in good condition and took up her former duties. Soon the quinidine was used only on alternate days or every third day, but when it was too greatly reduced the patient felt the need of a larger amount. Aside from the cardiac effect of the drug, the patient's goitre was not only reduced, but became smaller than it had been previous to the menopause.

Proceedings of Societies

AMERICAN THERAPEUTIC SOCIETY.

Twenty-third Annual Meeting Held in Washington, D. C., May 1 and 2, 1922.

Dr. Robert D. Rudolf, of Toronto, in the Chair.

(Concluded from Vol. CXVI, No. 11, p. 672.)

Quinidine Therapy in the Fibrillating Auricle.—Dr. L. F. Bishop, of New York, read this paper, which appears on page 528.

Circulatory System in Tuberculosis.—Dr. F. M. Pottenger, of Monrovia, Cal., read this paper, which appears on page 541 of this issue.

Myocardial Degenerations and Their Treatment.—Dr. A. E. Roussel, of Philadelphia, read this paper, which appears on page 555.

DISCUSSION.

Dr. H. C. Gardinier, of Troy, N. Y., in discussing these three papers, asked Dr. Pottenger how frequently he met the socalled small heart, dropped or ptosed heart, or bathycardia, in his clinical work; how frequently had he found tuberculosis clinically or at autopsy table associated with mitral valve disease, especially organic mitral stenosis.

In regard to Dr. Bishop's paper, he said he had had no experience whatever with quinidine, and that he had been so well satisfied with the treatment of auricular fibrillation by rest, quiet, diet, and digitalis that he had been reluctant to take up the use of this quinine salt, especially since serious results and some fatalities from its use had appeared in the literature.

Dr. Roussel, he thought, had not brought out in his paper the importance of a recognition of the gallop rhythm in the diagnosis and prognosis of myocardial disease. His experience had been that gallop rhythm occurred in most cases of severe myocardial disease, and while it might disappear it not infrequently returned and from the viewpoint of prognosis might be looked upon much as true pulsus alternans is considered.

Dr. Thomas F. Reilly, of New York, said that all conditions of heart disturbance were called myocarditis and the importance of valvular murmur was neglected. To say murmur meant nothing. The only proof that there was something wrong with the heart was the presence of a murmur, the only symptom which irregular hearts had in common. In every case of endocarditis, myocarditis was present, and every case of myocarditis could not be recognized as such with a murmur associated with one of the auricles. In treating these cases large doses of arsenic should not be used. When arsenic was used instead of mercury, one decigram injected into the buttocks he considered a "safe" dose. He also said that he knew of no single measure that did so much good in myocarditis as a dry diet. Concerning the use of quinidine, its administration for the first time would cause the pulse to run much higher. In about twenty-five or thirty per cent. of the patients taking quinidine, the fibrillation did not disappear.

Dr. C. G. Jennings, of Detroit, said that Dr. Pottenger had stated that tachycardia was not a symptom which occurred in tuberculosis more frequently than in other diseases. He thought this observation somewhat unusual, as he had found tachycardia to be a symptom in practically all early cases of tuberculosis he saw. Dr. Pottenger might see his patients at rest more frequently than the office consultant, and it might be that under these circumstances tachycardia was not so frequent. He believed there was usually a moderate tachycardia in early tuberculosis. He agreed with Dr. Roussel that morphine was a powerful stimulant in pneumonia, as it was in myocarditis. It was a respiratory depressant but not in moderate doses; only when given in large doses. Pneumonia patients needed rest and morphine often gave it when nothing else would.

Dr. J. I. Johnston, of Pittsburgh, said he wished to stress one thing which Dr. Roussel had already stated, and that was that much could be learned concerning the heart by checking up electrocardiographic work with fluoroscopic study. His experience with the use of quinidine had been limited, but all his work had been checked up by the electrocardiogram and he felt sure that quinidine did correct fibrillation in a certain number of cases. In one case particularly, the patient responded very well and had remained free from fibrillation for over a year. From a study of the literature, as well as from indirect personal knowledge, he believed the use of the drug was not free from danger, and that in all cases minimum doses should be used at first.

Dr. J. Diner, of New York, wished to take exception to a remark made by Dr. Jennings, as he did not think it would look well in the records to state that a physician had not time to give a careful examination of the patient. He believed the fluoroscope was a valuable means of diagnosis, but the expert diagnostician had perfected himself and did make accurate diagnoses without the aid of the fluoroscope.

Dr. Robert T. Morris, of New York, said he considered opium was better than morphine because of its slower and longer continued action, with fewer reactions. If one spoke in terms of the extreme action of the alkaloids of opium, it was possible to arrive at Dr. Reilly's view of the criminal phase of the subject. Opium, properly used, however, lessened the degree of destructive influence that was carried to the centres of consciousness when pain was engaged in sending these impulses.

Dr. R. D. Rudolf, of Toronto, wished to ask Dr. Pottenger if he had any record of cases where the auricular rate had been slowed by digitalis. He had not seen any. He had used quinidine a good deal in the Toronto General Hospital and in about fifty per cent. of the cases had been able to restore the auricular rhythm temporarily. This had been confirmed by the electrocardiograph. In several instances the normal rhythm had been sustained for two, three, or even four months. When the auricular fibrillation had recurred he had been able to remove it a second time by quinidine. He agreed with Dr. Pottenger that when the rhythm had been restored the patient was often not so much benefitted as one might expect. Quinidine was still in the experimental stage and its use should be confined to hospitals where the patients were under constant observation.

Dr. Hyman I. Goldstein, of Camden, N. J., said the terms myocardial disease and myocarditis had been used in the past to describe certain conditions of the heart muscle. Some preferred the use of the term myocardial disease; others, as in the present discussion, were using the term myocarditis. Which term was correct? Dr. Reilly had stated that every case of endocarditis was an indication of myocarditis. Was this always a true myocarditis, or was it myocardial disease or weakness.

Dr. John J. Johnston, of Pittsburgh, said he believed we could learn a great deal concerning the heart by electrocardiographic work with fluoroscopic study. He had had limited experience with quinidine, but all their work was checked up by the electrocardiograph. Quinidine did correct fibrillation in time. He had one case which responded very well, but he felt that the use of the drug was not free from danger. Small doses should be used at first in all cases.

Dr. Ross V. Patterson, of Philadelphia, said that the intermittent and recurrent character of fibrillation had not been emphasized. There could be no doubt that many cases of auricular fibrillation were recurrent and that there was a spontaneous tendency to crises in many cases, and that with the administration of quinidine it should be considered whether the restoration of mechanism was due to the use of quinidine or to the spontaneous tendency present in many of those cases. There could be no doubt that quinidine was protoplasmic. Possibly it was due to this fact that it had such an effect on the heart. No heart action was really increased with the use of quinidine. In some cases the heart was more affected with fibrillating auricles than it was with normal mechanism through the use of quinidine. It might be that despite its use the abnormal mechanism was converted to normal mechanism, with some danger, in the hope that the normal mechanism would remain after the treatment with quinidine was discontinued.

Dr. R. D. Rudolf asked Dr. Bishop whether he subscribed to the general statement that quinidine should not be used in a case of decided decompensation. He thought that should be known and borne in mind.

Dr. F. M. Pottenger, of Monrovia, Cal., said there were a few questions which had been asked him that he should like to answer. First, the small heart in tuberculosis was a difficult thing to determine and he thought the only way it could be determined was in the early cases. There had been cases in which hearts had been measured by the orthodiagraph. One man several years ago had a heart that measured small for him, which was the case in a large percentage of these cases of tuberculosis. All people have some tuberculosis. About fifty per cent. of adults have adhesions in the lungs. He could not explain the fact that people with small hearts should prove tuberculous. He saw no reason why. Certain conditions, however, might have a tendency to make the heart smaller. There was a possibility that the patient with tuberculosis did not fill his auricles as fully as normally he might, consequently there would be less blood in the auricle and he might have a smaller heart, but he did not believe it. It was simply a condition in which the heart was small. He said he meant that was the reason for it. Of course there was no average size for hearts because individuals varied and many of the statistics of that kind were not reliable. Dr. Jennings, he said, evidently did not understand his statement concerning the rapid heart. The rapid heart was a factor and was important simply when a patient was exercising and when a patient was at rest the heart was not necessarily rapid. The more these things were studied the more symptoms would be understood and the better they would be able to understand their patients.

Dr. A. E. Roussel, of Philadelphia, said that regarding the relative proportion of myocardial disease to valvular disease attended with symptoms meant coexisting myocardial disease. As long as the muscle in valvular disease remained healthy there were practically no symptoms and the individual was capable of normal effort. Tachycardia in tuberculosis was more the question of heart instability, increased frequency on slight exertion and perhaps diminished frequency at rest. Regarding the gallop rhythm, the various changes in rhythm in myocardial disease were all of them more or less significant and yet it was interesting to note that not infrequently in patients over forty years of age an intermittent pulse might develop and continue for the rest of the patient's lifetime without an appreciable shortening of it. He also mentioned tropical infections and these necessarily included valvular disease associated more or less with sluggish intestines, resulting in a condition of toxemia which seemed to be productive of cardiac change.

Regarding the differentiation between the tachycardia which occurred in tuberculosis and that which occurred in hyperthyroidism and the soldier's heart, or the syndrome heart, it was here that he must insist that the diminution of the basal metabolism was of prime importance in distinguishing these relative conditions. Concerning the use of morphine, he was glad that the speakers had agreed with him regarding its usefulness in acute dilatation of the heart, and incidentally he wished to make reference to Dr. Reilly's remarks on the use of morphine in pneumonia. He thought he was in error. Morphine was of prime importance in pneumonia, but it should be used with the greatest caution at or near the time of the crisis. Recently he had had a case in New York, a patient sixty-three years of age with a massive pneumonia on the left side and a bad myocardial frequency with acute nephritis. To the astonishment of all, the patient made an unexpected and perfectly good recovery. Regarding the use of quinidine, it was his experience, although limited to hospitals, that it should be exhibited practically only in hospital cases that could be kept carefully under observation, and it would seem, as the results desired could practically be secured by other methods and as there was distinct proof of certain untoward effects that might occur, that this exhibition should always be used with caution.

Dr. L. F. Bishop, of New York, said that quite a number of interesting questions had been raised. First, as to the question of digitalis. He did not think they would ever know all about it, but they were learning things all the time, and fibrillation of course had aided them more than anything else. When it was recalled that only since 1908 had they known anything about fibrillation, it was easily understood that all the natural history of it could not yet be known. He stressed that question of natural history because he thought that only from natural history could the treatment be judged. Take the very question of what would stop fibrillation; one of the few things that stopped fibrillation was digitalis. Take the question of the drugs that had a tremendous reputation. Thousands of doctors used them. He did not doubt that they were taken up in every college. Look at the cactus for instance. No doctor he had ever known had ever been able to discover any good in cactus, but it had a great reputation in heart disease. To say that fibrillation would be present in a regular heart was not true, for if a heart was regular it was not fibrillating. Digitalis never made a heart regular in the world. It made a great many irregular. It had nothing to do with making a heart regular. That was a great mistake in the profession. It never made a heart regular, but it did a great many other things. He thought that the consensus of opinion was that it was not safe to use quinidine in a decompensated heart.

Transfusion.—Dr. Edward H. Goodman, of Philadelphia, read a paper on this subject, which appeared in the February 21, 1923, issue of the Journal.

Dr. William Seaman Bainbridge, of New York, in discussing Dr. Goodman's paper, said that during the early years of the war he had seen a great deal of work being done, on the other side, and later, in 1920, when transfusion had been used in cases of chronic sepsis where the patients' condition seemed to remain stationary for weeks and months, with no gain and apparently little loss. These cases had been put on the upgrade by the use of transfusion.

Dr. W. W. Babcock, of Philadelphia, called attention to the fact that transfusion did not absolutely supply loss of blood. In transfusion the blood was not the same as loss of blood by hemorrhage or other cause. In certain cases, such as those of hemorrhage where the patients were apparently dying from loss of blood, transfusion seemed at times valueless. He recalled the case of a soldier who was dying from hemorrhage. He was placed on the operating table and was given a quantity of blood, a very large and rapid transfusion, and he died on the operating table. They could not replace the condition, could not restore him in the least. On the other hand some of the results that had been obtained from transfusion could have been obtained by use of a very simple solution. He thought they should be very thorough in determining results. In some cases they get good results and sometimes they did not.

The Standard Treatment of Malaria, Its Effectiveness in Relieving the Clinical Symptoms of Malaria.—Dr. C. C. Bass, of New Orleans, La., read a very interesting paper on this subject, in which he stated that the standard treatment for malaria recommended by the National Malaria Committee was, for the acute attack, ten grains of quinine sulphate by mouth three times a day for a period of at least three or four days, to be followed by ten grains every night before retiring for a period of eight weeks. For infected persons not having acute symptoms at the time, only the eight weeks' treatment would be required. Dr. Bass discussed the effectiveness of the first part of the treatment for the purpose of relieving the clinical symptoms. The paper will be published in full in a later issue.

Dr. S. L. Dawes, of New York, who opened the discussion, said that most of them were not competent to discuss Dr. Bass's paper as they did not see malarial fever. He wished, however, to express his appreciation of the paper.

Dr. E. P. Fick, of Seattle, Wash., asked Dr. Bass if he had ever used quinine intravenously in treating malarial conditions.

Dr. Robert E. Rudolf, the chairman, said he wished to make a single statement. When he first began the practice of medicine in the northeast section of Philadelphia in connection with the Episcopal Hospital there, a large number of cases of malaria had been treated. While, as a rule, in acute cases quinine was liberally employed, and successfully, there was a class of cases in which it became necessary to use some other treatment. In these well defined cases they had employed cinchonidia sulphate, and had a feeling there was better effect than with quinine itself. He wished to know whether Dr. Bass had ever hit upon anything other than quinine that was specific in the treatment of malaria.

Dr. C. C. Bass, of New Orleans, in answer to the question as to whether previous quinine treatment might make an individual require a larger amount to relieve the clinical symptoms, said that some good authorities believed that it did, but he doubted it. He did not know of any scientific experiments that furnished the answer to this question. The intravenous administration of quinine had no place in the treatment of malaria except in very rare instances in which it could not be given by mouth; and only when it was believed that the patient's life was in great danger on account of the disease. He did not think any preparation other than cinchona could be more effective than quinine in relieving clinical symptoms, since it was practically one hundred per cent. effective.

Spinal Anesthesia in Relation to Associated Therapeutic Problems.—Dr. W. Wayne Babcock, of Philadelphia, read this paper, which will appear in a later issue.

There was no discussion.

Industrial Medicine a Community Problem.—This paper by Dr. Andrew McFarlane, of Albany, N. Y., was read by title. There was no discussion.

Some of the Activities of the Medical Corps of the United States Navy in the War and Postwar Periods.—Dr. William Seaman Bainbridge exhibited moving pictures showing some of the activities of the United States Navy in the physical reconstruction and physiotherapy in the reconstruction period after the war. He also gave a travelogue with the reels of some of the methods and practical results of lessons learned in the World War, from medical, surgical and sanitary viewpoints.

Abstracts from Current Literature

HEART AND BLOODVESSELS.

Arteriosclerosis and Arteriolosclerosis.—J. Pal (*Wiener klinische Wochenschrift,* July 27, 1922) states that in arteriosclerosis it is important to control carefully the fluid intake by the patient. In advanced cases, the fluid intake should be as low as possible, including the water content of the food. Alcoholic beverages should be restricted or prohibited as patients with arteriosclerosis are peculiarly susceptible to vascular poisons. Effervescing beverages (carbonic acid) and beer should also be avoided. The ingestion of excessive amounts of fluid may be counteracted by the administration of a diuretic once or twice a week. There is no foundation for the belief that theobromine and iodine have any curative effect on the disease process: they do not reduce the blood pressure. Diuretin dilates the bronchi and the coronary and renal arteries and indirectly, through the action on these arteries, it probably lowers the high blood pressure when no rigid anatomical changes have occurred. Iodine occasionally produces a considerable loss of weight, which also helps somewhat. Blood letting is an important therapeutic remedy in acute cases and cardiac insufficiency (pulmonary edema), but repeated venesections are useless and may even lead to hypertonia and secondary anemia. The treatment of attacks of stenocardia, cardiac asthma, and angiospastic conditions, is an important part of the therapy. Heat and vasodilator remedies are valuable. The treatment with aspirin is important, but narcotics (especially morphine) must be avoided: for this purpose, aspirin, 0.5 to 1.5 or 2.0 gm., given best per os or per rectum in a solution of sodium bicarbonate, has been found useful in conditions of vascular pain. In attacks of stenocardia, intravenous injections of papaverine are considered preferable to their subcutaneous injection; recently the intravenous injection of atropine or novatropine has been found very effective. Morphine, if used at all, should not be given alone; combinations of papaverine, or possibly pantopon, domopon, etc., are preferable to pure morphine. In angiospastic processes of arteriosclerotic origin, the use of quinine has recently been recommended and deserves a trial.

A Paraganglioma of Zuckerandl's Organ Associated with Hypertrophy of the Heart and Kidney.—Max Hausmann and Sophie Getzowa (*Schweizerische medizinische Wochenschrift,* September 14, 1922) report the following clinical and anatomical symptom complex in a patient who died of grippe pneumonia: a chromaffin tumor (paraganglioma) of Zuckerkandl's organ, hypertrophy of the heart and kidney, hypertension, polyuria and transient glycosuria. This apparently idiopathic cardiac hypertrophy, the authors attribute to the effect of the tumor or its adrenalin, and they designate it as cardiac abnormalities of the adrenalin heart. The myocardium showed changes, which have also been found in the hypertrophied hearts of rabbits following intravenous injections of adrenalin (isolated indurated foci, partial diffuse sclerosis and an extreme hypertrophy of the muscle fibres); there was no vascular sclerosis. The symptoms of cardiac hypertrophy and of hypertension clinically suggest chronic hypertensive renal diseases and hypertensive arterioscleroses with cardiac hypertrophy and the polyuria and glycosuria suggest diabetes insipidus and socalled innocuous diabetes. Therefore, a hyperadrenalinism or an adrenalin heart must be considered in hypertonic cardiac hypertrophies, which results from a tumor or a hypertrophy of the chromaffin tissue. The authors consider such a tumor as related to the endocrine adenomas, some of which are characterized by a capillary network with masses of cells in its coils. These include certain tumors of the hypophysis, the thyroid, the parathyroids, the chromaffin tissue and the cortex of the adrenals; also the socalled hypernephroma. The endocrine adenomas may have hormonal action.

The "Sixty-Six" Pulse.—Jesse G. M. Bullowa (*Medical Clinics of North America,* November, 1922) lays emphasis upon the importance of the sixty-six a minute pulse rate as an objective sign of pain. In acute conditions it is a physical sign of vagotonia—either of an overacting vagus or of a deficient sympathetic innervation of the heart. The sixty-six pulse as evidence of vagus tone is an important and often disregarded sign of the severity of irritative abdominal lesions, but the intestinal tract is not the sole source of such vagotonic slowing of the pulse rate, as it may also be produced by spasm of the ureter. It may also occur during the administration of digitalis before nausea or coupled beats appear (ample vagus stimulation) and in stimulation of the sympathetic system by diphtheria toxin in diphtheria.

Hemostatic Action of Pituitary Extract.—Perrin, Hanns, and Stefanovitch (*Paris médical,* March 10, 1923) tested the action of posterior pituitary extract on blood coagulation, blood pressure, and pulse rate in ten patients suffering from miscellaneous disorders, independently of actual hemorrhage. One to two mils of the preparation were injected intravenously. In eight cases the coagulation time was more or less markedly shortened, in one case unaffected, and in a case of purpura, lengthened. The effect on blood pressure was less constant. In four cases it was lowered by fifteen to twenty millimetres of mercury and in two by thirty to forty millimetres. The reduction of pressure began in ten minutes to one hour after the injection and persisted for two to five hours or longer. The extent of reduction did not parallel the dose injected. In the remaining four cases the blood pressure was unaffected. The pulse rate was unchanged in five cases; in three it was slightly lowered; in one it dropped from eighty to forty, and in one it was increased. The actions on the pulse rate and blood pressure seemed to be independent, as the case with greatest pressure reduction showed no change of rate and the one with greatest pulse lowering showed no reduction of pressure. The hemostatic action of pituitary extract appears to be mainly due to its action on blood coagulation.

The Failing Heart.—Paul D. White (*Boston Medical and Surgical Journal,* November 23, 1922) says with regard to the treatment of anginal failure: Rest is essential, mental and dietetic as well as physical. Nitroglycerine or amyl nitrite are, of course, invaluable and should always be carried by the patient suffering from heart pain of the anginal type. Morphine should be given freely if necessary; when much of it is necessary coronary thrombosis is probably the underlying condition. Digitalis is generally contraindicated in the anginal type of heart failure, but may help a good deal if the heart pain is due to right ventricular fatigue in mitral stenosis, or to the left ventricular fatigue in chronic hypertension. A light diet, particularly light in bulk, is of great importance; quantity is much more vital than quality. Five small meals a day, with the last one the lightest, forms a good program. Avoidance of taxing business cares as well as absolute omission of abruptness in physical activity, must be advised. Rest will not only cause the cessation often of anginal pains, but incidentally is by far the best treatment for hypertension which may or may not be associated with the angina. As low a blood pressure as 115 mm. systolic has been met with in marked coronary sclerosis. If syphilis is proved or likely antileutic treatment, begun with care, may be very beneficial.

Syphilis of the Heart and the Aorta.—Harold Wiltshire (*Clinical Journal,* September 27, 1922) says that the general treatment and management of heart failure due to syphilis are exactly the same as for heart failure due to any other cause. In the attack against the syphilis itself, however, it is well to remember that salvarsan injections are not free from danger when the heart and aorta are affected. An injection may be followed by an acute exacerbation of inflammation in any syphilitic focus, just as an injection of old tuberculin may provoke an intense reaction in a tuberculous lesion. If, as is so often the case, the coronary arteries happen to be involved in the syphilitic process, an injection may precipitate an anginal attack, or sudden death. (In the case of heart failure quoted above, the story suggests a general myocardial reaction following an injection.) In consequence it is wise, if salvarsan is given, to take precautions by administering a previous course of iodide and mercury, by keeping the patient in bed for the injection, and by starting with a small dose, for instance, 0.1 gm., and by increasing the dose gradually.

Cardiac Complications of Gonorrhea.—W. S. Thayer (*Bulletin of the Johns Hopkins Hospital,* October, 1922) analyzed the cardiac complications of gonorrhea occurring at the Johns Hopkins Hospital during thirty-three years. In 176 instances of acute endocarditis of determined origin, twenty, or 11.3 per cent. were gonococcal. But little evidence could be obtained as to the relation of the time of onset of the cardiac involvement to the appearance of the disease or other complications, arthritis occurring in only 41.1 per cent. of the Johns Hopkins cases, though in 68.5 per cent. of fifty-four cases collected from other sources. The cardiac complications of gonorrhea were usually acute or subacute vegetative and ulcerative endocarditis, appearing at varying periods during the course of the infection, with a sudden or more gradual onset, but usually rather acute, with chills and high remittent or intermittent fever, rapidly developing anemia and considerable leucocytosis, and frequently a petechial eruption. Embolic phenomena are common. The urine shows albumin, casts, often blood, and in the longer cases anasarca and hydrops are evidence of a grave nephritis. The course usually was from four to nine weeks. The aortic valves were those commonly involved, but as in all acute endocarditides, the right side was more often affected than in the chronic, socalled rheumatic valvular disease, and in the cases studied, involvement of the pulmonary orifice was rather common. The cardiac involvement was not restricted to the endocardium, as endoaortitis, pericarditis, and suppurative myocarditis are not unusual. Gonorrheal endocarditis is in general a malignant process having a progressive and fatal course, occupying a position in its virulence between the slower and more subacute Streptococcus viridans and Bacillus influenzæ infections and the more virulent Staphylococcus albus, Staphylococcus aureus, pneumococcus or Streptococcus hemolyticus endocarditides.

Mechanical Vibration Therapy.—M. L. H. A. Snow (*American Journal of Electrotherapy and Radiology,* April, 1922), in presenting the report of the committee on mechanical vibration therapy and apparatus, gives the following summary: 1. Mechanical vibratory treatment has a marked effect on blood pressure. 2. In some cases of hypotension it may raise blood pressure. 3. In cases of hypertension, it has an effect to lower blood pressure. 4. In cases of reversed postural relation of blood pressure in lying and sitting it corrects the abnormal relation or if the disparity is great it induces an approach to the normal. 5. The ordinary cases of reversed postural relation of the pulse rate are corrected by mechanical vibration. 6. Mechanical vibration lowers high pulse rates, as in cases of chorea or exophthalmic goitre, vibratory treatment being given in the intervertebral spaces from the second to the sixth dorsal vertebra for five minutes. 7. Mechanical vibratory treatment in cases of lack of functional tonicity of the heart muscle, without being diseased, is capable of increasing the tone of the heart either directly or reflexly by nerve stimulation. 8. Mechanical vibratory treatment induces contraction of dilated bloodvessels. These results might be duplicated by other forms of stimuli, but the relative values of such are as yet unknown.

Contribution to the Study of Essential Hypertonia.—W. Kerppola (*Finska Läkaresällskapets Handlingar,* July-August, 1922) calculates that in essential hypertonia the blood count shows an increased hemoglobin content in about fifty per cent. of the cases and increased red corpuscle content in about forty-five per cent. of the cases, slight leucocytosis in about thirty per cent., and a marked mononucleosis in about sixty per cent. In sixty per cent. the blood coagulation was normal, in forty per cent. somewhat reduced. The blood sugar content on a fasting stomach was usually normal. Reduced sugar tolerance was observed in eighty per cent. of the cases, of which about twenty-five per cent. showed alimentary glycosuria. Diabetes is quite frequently combined with hypertonia in persons over forty years of age, but only exceptionally in younger people.

Rapid Digitalis Effects by Oral Administration.—Francis R. Fraser (*Lancet,* September 30, 1922) finds that digitalis administered by the rapid method, with doses of one and a half drams, one dram and half a dram of the tincture at intervals of six hours, produced a definite and prompt slowing and clinical improvement in cases of auricular fibrillation with rapid ventricular rates in five to twelve hours; the maximum effect was noticeable in fifteen to thirty hours. This method of administration of digitalis is not suitable to cases of normal rhythm, but it is of great value in cases of auricular fibrillation with rapid ventricular rate and urgent symptoms.

The Process Which Results in Auricular Fibrillation.—James Mackenzie (*British Medical Journal,* July 15, 1922) asserts that the term auricular fibrillation is not descriptive, because the fibrillation is a result and not a cause of the loss of control of the heart muscle, and for it he proposes the term auricular paralysis. Just as in all other muscle tissue, fibrillation results only when the muscle is uncontrolled by its motor nerve. The change in the action of the heart muscle takes place in the sinoauricular node or in its connection with the auricle. The same result occurs when the ventricle escapes from the control of the conducting system.

Central Influence of Atropine and Hyoscine on the Heart Rate.—W. J. R. Heinekamp (*Journal of Laboratory and Clinical Medicine,* November, 1923) concludes from his experiments that atropine sulphate in small doses causes inhibition of the heart, which he believes is due to direct stimulation of the medulla. His experimental findings corroborate the results of McGuigan and Harris, both of whom obtained clinical evidence that atropine in small doses, 0.001 gm., produces slowing of the heart, while larger doses accelerate it. The action of hyoscine is similar to that of atropine on the turtle brain.

Relation of Hypertension to Cardiorenal Diseases.—Nellis B. Foster (*American Journal of the Medical Sciences,* December, 1922) can find no adequate evidence for belief that hypertension is a predominant factor in the causation of arteriosclerosis. Our present knowledge seems to indicate in a general way that organic change in the kidneys and vessels may arise in diverse manners, the least indefinite of these being through intoxications of infectious origin. There are suggestions that intoxications resulting from abnormal metabolism may have a similar effect. These intoxications produce at first only functional disorders chiefly referable to the nervous system; when persistent, they induce organic changes affecting the bloodvessels and kidneys.

Theory of Suprarenal Arterial Gangrene.—V. A. Oppel (*Lancet,* July 15, 1922) states that not infrequently a spasm of the arteries, causing a complete blanching of the fingers is seen, which is ascribed to a comparatively slight increase in the quantity of adrenalin circulating in the blood of such patients. As a result of his experiments, the author asserts that in human pathology, in suprarenal arterial gangrene, the concentrations of adrenalin must be less than one in one hundred million, as concentrations of about one in eighty million produce ischemic paralysis, which, if such concentrations are maintained for some time, must rapidly end in gangrene of all the limbs simultaneously. Clinically, no such occurrence is known. In human pathology, the hyperadrenalinemia only gradually disturbs the nutrition of the arterial walls with a resulting change in them and in the contained blood. The existence of such an hyperadrenalinemia is recognized by an increase in the vasoconstrictor effect of the blood serum occurring in socalled spontaneous gangrene. The author's contention is also substantiated by the result of treatment of the socalled spontaneous gangrene by excision of the left suprarenal gland, on the one hand, and by the pathological anatomical data on the other.

TUBERCULOSIS.

The Röntgenogram and the Therapeutic Indications in Tuberculosis of the Bones and Joints.—F. de Quervain (*Schweizerische medizinische Wochenschrift,* October 19, 1922) believes that although the roentgenogram is an important element in the more accurate diagnosis of tuberculosis of the bones and joints, nevertheless, it is only exceptionally of value as such in the determination of the therapeutic indications, inasmuch as other factors than the anatomical diagnosis of the local disease also come up for consideration in the selection of any treatment. Neither can the roentgenogram alone determine the nature of the treatment while a case is being followed roentgenographically during a course of treatment, as here again the other clinical symptoms of a local and general nature must also be considered. Not infrequently, a circumscribed local rise of temperature and local tenderness show that something is wrong at a particular site even though the roentgenogram shows nothing abnormal and no recent changes in the bone. On the other hand, the roentgenogram occasionally casts doubts upon the process of healing, even in those cases in which the clinical symptoms show that the process is no longer active. Taken all in all, it appears that the roentgenogram, *per se,* is just as unable to serve as a guide in the determination of indications of treatment as any other means of laboratory diagnosis. Roentgenography attains its full value as an indicator of treatment only in its associated use with the other medical and extramedical factors upon which the choice of any method of treatment depends in the individual case.

The Röntgenotherapy of Tuberculosis.—Hans E. Walther (*Schweizerische medizinische Wochenschrift,* October 19, 1922) maintains that it is advisable to use at first only small doses of x rays in every form of tuberculosis, such as about twenty to twenty-five per cent. of the skin unit dose and never more than forty per cent. It is also desirable to use a uniform, homogeneous irradiation, which renders the calculation of the surface dose easy. Roentgenotherapy should be tried in every form of tuberculosis, except those cases in which the general condition is much reduced (as in a positive amyloid reaction). It should also be omitted in all caseous and suppurative processes, in renal tuberculosis which cannot be drained externally, where it should be used only as a postoperative treatment, and in all those forms of pulmonary phthisis which show a pronounced tendency toward breaking down. Roentgenography is valuable only when it is used in rational combination with other tried methods of treatment, as in socalled surgical tuberculosis, in which the other necessary surgical measures must not be omitted. Caseous matter and pus must be allowed to drain and in involvement of the supporting skeleton thorough relief from weight bearing must be provided for. Immobilizing dressings must be avoided and in involvement of the spinal column and of the lower extremities, bed rest is absolutely necessary. Natural or artificial heliotherapy is a valuable aid. Hospitalization should be avoided wherever possible. If the general condition is poor, arsenic, preferably in the form of arsacetin, is indicated. Roentgenotherapy is undoubtedly valuable in tuberculosis.

Tuberculosis From the Clinical Point of View.—Basing his conclusions on the fundamental investigations of Rankes, Wilhelm Neumann (*Wiener klinische Wochenschrift,* October 19, 1922) classifies tuberculosis, from the clinical point of view, into three groups: 1, the primary complex, consisting of cases with a primary focus plus involvement of the draining lymphatics up to the regional lymph nodes; 2, the cases with the proliferating primary complex—the primary focus from which the dissemination of the tubercle bacilli reaches the blood—which may be either malignant (general miliary tuberculosis), virulent (hematogenous tuberculosis with a more favorable prognosis), or bland (tuberculosis of the eye, chronic recurrent pleurisy, chronic polyarthritis, etc.); and, 3, massive infiltration with an existing immunity as a result of a healed primary complex (the usual forms of chronic pulmonary phthisis). The various forms of tuberculosis may be fitted into this scheme.

Tuberculosis in Children.—This subject is dealt with from the viewpoints of the pediatrist, the orthopedist, the internist, and the surgeon, in the *Boston Medical and Surgical Journal,* September 28, 1922. John Lovett Morse is of the opinion that the preventive treatment is by far the most important. When tuberculosis has developed the treatment consists of rest, food, fresh air both day and night, and all the sunlight there is. He has no confidence in any drug treatment, except for the relief of symptoms. Tuberculin treatment seems to him to have done more harm than good. Joel E. Goldthwait says that in tuberculosis of the bones and joints the first thing is to prevent deformity, or correct deformity if it has occurred, the second to put the part in the position of physiological rest and then allow function in so far as the part will tolerate it. Anything the individual, not someone else, can do with a diseased part is little likely to do harm. As fast as the child is able to use the part, it should be encouraged to do so. Use stimulates circulation, encourages bone repair, and stimulates the cells about the diseased portion so that they will be stronger and able to control the disease, rather than to weaken those parts by too great inactivity. Henry D. Chadwick recites the points upon which a diagnosis of juvenile tuberculosis must be based as follows: 1. History of frequent colds or predisposing causes such as measles, whooping cough, and influenza. Also the frequent association of phlyctenular disease and scrofuloderma with hilum tuberculosis should be kept in mind. 2. Symptoms of tuberculin toxemia, viz., fatigue, malnutrition, anorexia, febrile attacks. 3. Exposure to tuberculosis in the home. 4. Positive cutaneous tuberculin test. 5. Evidence of enlarged tracheobronchial lymph nodes and infiltration or thickening of the adjacent tissues as demonstrated by physical signs and confirmed by röntgenogram. Lloyd T. Brown says that surgery, meaning probably operative surgery, is and should be the exception in these cases, and that it should be always only an incident in the general treatment, which is necessarily prolonged.

Erythema Nodosum and Tuberculosis.—A. Wallgren (*Acta Pædiatrica,* July, 1922) reports several illustrative cases and concludes that erythema nodosum is most probably a disease *sui generis,* a specific acute, infectious disease which usually appears sporadically, requiring a certain predisposition of the organism in order to develop. A previous tuberculous infection may provide such a predisposition. When several people coming in contact with each other have been infected with tuberculosis, and thus have been rendered predisposed to erythema nodosum, the disease may assume an epidemic character. The fact that erythema nodosum is so often followed by tuberculosis may be explained by the fact that this most frequently occurs in children who are suffering from latent tuberculous infection which is revived during the weakened condition caused by the erythema nodosum.

Radium as a Curative Agent for Tuberculous Glands.—Echlin S. Molyneux (*Lancet,* October 14, 1922) maintains that radium will cure even severe cases of tuberculous glands if the proper technic is carried out, without a waste of time and without leaving unsightly scars. The author's technic is the following: Square, flat applicators, containing fifteen mg. of radium bromide, two cm. square or twice that size, are used. The applicator is made of silver three mm. thick, over which the radium is spread and made to adhere by a form of cement. The applicator has over it a screen of one mm. of silver, then a layer of lint and finally a couple of layers of thin guttapercha tissue tied over the whole. The gutta percha tissue can be renewed for each patient. This applicator, thus protected, is strapped to the patient over the glands to be treated for four to eight hours with a one inch applicator and half that time for a smaller one. Two or more applicators may be necessary to cover the entire area of disease. The dose is administered twice a week at first and once a week when the glands are markedly retrogressing, but each case must be judged on its own merits in regard to the frequency and number of treatments necessary. Patients with early tuberculous glands recover the soonest, then those with suppurating glands; those with large masses of caseating glands that have not broken down take the longest time to heal. The treatment is continued until all the signs of disease have disappeared, leaving only tiny fibrous nodules. A cold abscess should be aspirated with a needle before beginning with radium treatment. The patient is not invalided in any way with this treatment. Only violent exercise is prohibited. The radium seems to have a general tonic as well as a local effect. Carious teeth or diseased tonsils and adenoids, if present, must be eradicated at the beginning of treatment.

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NEW YORK, WEDNESDAY, MAY 2, 1923

DERMATOLOGY.

Treatment of Erysipelas by Vaccines.—J. Ronaldson Russell (*British Medical Journal,* July 1, 1922) reports an immediate improvement in the local and general condition of a patient suffering from erysipelas of the face after an initial injection of antistreptococcal vaccine (five million germs) and a second dose of twenty million germs. Uneventful recovery followed.

Röntgenotherapy of Carcinoma of the Skin.—G. Miescher (*Schweizerische medizinische Wochenschrift,* August 10, 1922) states that: 1. The superficial basal celled carcinoma (rodent ulcer) is easily cured by röntgenotherapy with the proper dose and a single exposure—about two to two and a half times the erythema dose. This dose is not harmful, unless too great an area is treated. 2. Hard rays are not necessary to effect a cure, provided the dosage is high enough. 3. The piercing ulcer and cancroid are also well adapted to röntgenotherapy, provided they are accessible and provided the entire area of the carcinoma may be subjected to a double erythema dose. The bone tissue, however, must be protected. Insufficient irradiation makes the prognosis worse. The single intensive irradiation is indicated in these forms even more than in the cancroid, as serial irradiation involves the danger of superficial healing and deep recurrences. The use of relatively weakly filtered rays does not always suffice and in some cases, therefore, a deep quotient resulting from irradiation through a strong filter is necessary. For the same reason, irradiation from a distance should be used. In extensive carcinomata of large portions of the soft parts of the face, the proper dose is important so as to avoid unpleasant consequences. The entire technic should be based on the biologically determined erythema dose of the individual for the various degrees of ray hardness. The physical criterion is the iontoquantimetric determination; with very hard rays (0.5 mm. of zinc, 1 mm. of brass, etc.), the Sabouraud and Kienböck procedures are not reliable. The statements of manufacturers of apparatus should not be relied upon. 4. There is no basic difference in the behavior of the various skin carcinomata toward röntgenotherapy and it is purely a question of technic. 5. There is no definite dose for carcinoma of the skin. 6. Irradiation of the lymph nodes is superfluous in basal celled carcinoma and in piercing ulcer.

Zinc Ionization as a Disinfectant in Local Sepsis, Illustrated by Its Use in Chronic Otorrhea in Children.—A. R. Friel (*British Medical Journal,* July 8, 1922) maintains that zinc ionization is an efficient method of sterilizing an infected cavity. If the sepsis is confined to the tympanum and the perforation in the drum is large enough to allow fluid to enter the ear, a complete cessation of the discharge is consistently obtained. If another lesion, such as a polypus or large granulations, is present, this should be removed first; complicating conditions, such as inflamed tonsils or adenoids, purulent rhinitis or sinusitis, or pyorrhea must also be eliminated first. In the series of tympanic cases observed, nothing but zinc ionization, with or without the insufflation of boric acid, was employed; in very slight cases, the insufflation of boric acid, without ionization, was used. The author also believes that zinc ionization is the remedy par excellence for the septic factor in endometritis, abscesses, boils, pyorrhea and accessible wounds and he suggests its use in sepsis of the uterine cavity following infection in childbirth. The treatment should always be administered by the physician himself.

Treatment of Psoriasis.—Hudelo (*Paris médical,* June 24, 1922), in the internal treatment of psoriasis, endorses Veyrières's procedure, viz., the giving of arsenic in small doses intermittently for long periods of time. Sodium arsenate is given in a 0.05 per cent. solution, two tablespoonfuls of which are taken daily in the middle of a meal, mixed with a large tumblerful of water. The drug is continued for three week periods separated by intervals of the same length. This treatment has seemed to the author useful in delaying and at times even preventing recrudescences of the disease. Massive intravenous arsenical injections, as advised by Ravaut, proved of little value in the author's hands, seemingly causing the lesions to acquire an inflammatory character. In some forms of psoriasis with rebellious and infiltrated lesions, unquestionable results have at times been obtained from intramuscular injections of mercurial compounds, such as the biniodide, yellow oxide, and calomel. Aside from arsenic, however, the most promising internal measure consists in the administration of sulphur. The writer praises the use of Pautrier's solution of sulphur, consisting of octahedral sulphur, five grams; cholesterinated oil, twenty grams, and eucalyptol, eighty grams. This preparation, which should be kept in ampoules protected from light, is injected into the gluteal muscles twice a week to the amount of one or two mils at a time. It causes little local disturbance and dose not induce fever. After the lesions have disappeared following this treatment, the injections should be continued at longer intervals for some time. The results cannot as yet be said to be greatly superior to those obtained from arsenical medication.

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The Beginnings of Diagnosis

By JONATHAN WRIGHT, M.D.,
Pleasantville, N. Y.

It is not without interest, in the present exalted state of medical and surgical diagnosis, to take a survey of its beginnings. An enumeration, a mere catalogue of the instruments and the instrumentations, of the processes which enter into our everyday life as practitioners, would in itself transcend the space of volumes. It is probably true, indeed the best evidence we have points to the fact insisted upon by ethnologist and evolutionist alike, that neither do we now surpass antiquity in mental capacity nor does the average mental capacity with which children are born into a civilized world, either modern or ancient, surpass that of children born into a primitive environment. It is the social inheritance, not the germ plasm inheritance, that is the true endowment the infant meets the moment it opens its eyes in the modern civilized world, and it is the use society compels him to make of that inheritance which sustains the supremacy of a civilization. There is a constant demand, an ever increasing strain on his faculties, which sharpens his wits and broadens their field, deepens the draught of the vessel of mentality as it sets out on its adult voyage in life. Anything which enhances that acuteness, which broadens and deepens that mentality, is the product of the environment, and it should be the aim of those who have imposed upon them or impose upon themselves the herculean task of maintaining and guiding civilization constantly to keep in view and to multiply those environmental influences which do that. But in consciously or unconsciously pursuing this duty of aiding progress the substitution of instrumentation and the relief afforded mental exertion may defeat the end in view. For the sake of an efficiency to a material end we invalidate the human faculties which themselves are the mainstay of a complex civilization, however resistant and unaffected the precious germ plasm, the only immortal, immaterial, metaphysical, inconceivable product modern biology has introduced into a materialistic world.

This is practically the thought behind the argument Herbert Spencer used in the effectual resistance offered to the introduction of the metric system into the Anglo-Saxon civilization. He was one of the anxious ones watching over it and in his last years rendered himself a little ridiculous when he saw a perverse social world laying aside the processes by which the unfit perish in the struggle for existence. His was the last gasp of the old Manchester adjuration of every man for himself and the devil take the hindmost. He was solicitous for the continued mental capacity of his fellow countrymen and he objected to the metric system because it made figuring too easy. Much more of beneficial mental exercise is obtained by calculating in the cumbrous and complicated system of weights and measures we have, almost unaltered, as an inheritance from the civilization of ancient Egypt. If there is anything to this argument, and there are historical data which could be adduced in its support, we are muddling our wits with the multiplicity and the effectiveness of our instrumentation in diagnosis. The factory hand who does a thing a thousand times a day and the same small thing, the man who presses a button and lets machinery do the rest, the man who lets the colorimeter take the place of his eyes and the calorimeter and the thermometer take the place of his hand, the man who uses the stethoscope and even the osphresiometer instead of his ears and his nose, may indeed be handling the instruments of his own destruction. This may be an argument full of fallacies and I am afraid it is, but let us pause for a moment in our historical studies to remember that primitive man had none of these things and ancient civilized man only had them in a quite negligible supply so far as the argument goes for the greater acuity of his natural faculties.

These considerations, though largely hypothetical, are not entirely without coherence with what we have to consider in the study of the beginnings of medical diagnosis. In the first place, as always in going back to prehistoric or early historical things, especially in the history of science, we meet with a lack of differentiation which we must guard ourselves against regarding with contempt and neglect.

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Approaching our theme more nearly we come to realize that the savage does not think at first of etiology in a selfconscious way at all, so far as a specific application is concerned. It is his intuition, what he has from his social environment, which guides him in such appreciation of it as he has.

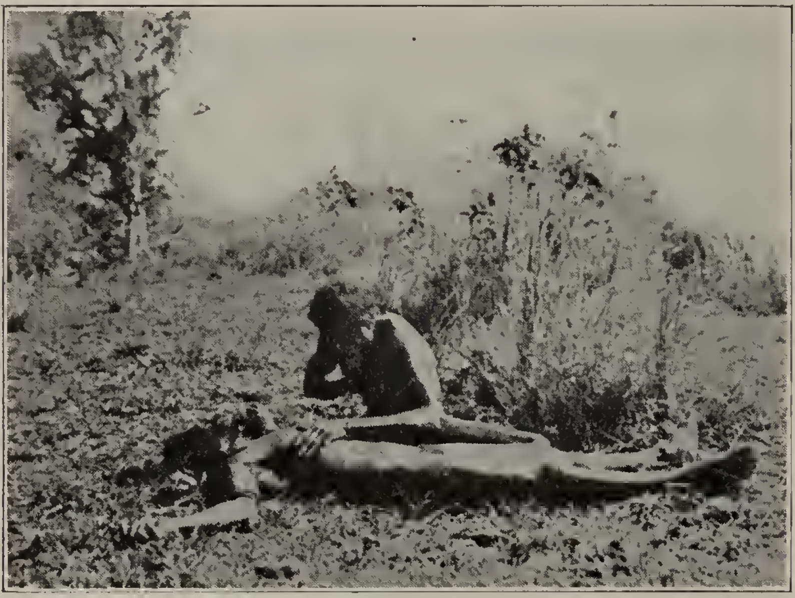

Fig. 1.—Medicine man rubbing his hand under his armpit to secure moisture to rub on the patient. (Kakadu Tribe.)

Something has gone out of the unconscious man. It must be a part or a whole of the world spirit which animates all things that has left him, and in Australia, like Elijah, he attempts to blow the pneuma back by placing himself mouth to mouth with the patient, or as in Egypt once, or as among the Indians of our North Pacific Coasts, he tries to blow air into the anus. Historical times acquired a bellows for this purpose. Or some evil spirit has got into the man and the doctor tries to suck it out. (Figs. 1 and 2.) It is easy to show the patient anything the doctor can hide in his mouth anyhow. Therapy follows so close on diagnosis we can scarcely separate the two. Both are entirely dominated by cosmic theories.

Several years ago in this journal (August 4-11, 1917) I drew attention to this matter, but I shall only repeat the quotation I then made from Dobrizhoffer's account of the method of diagnosis among the Paraguayan Indians in the Eighteenth Century: (1) "At his first coming, the physician overwhelms the sick man with a hundred questions: 'Where were you yesterday?' say he, 'What roads did you tread? Did you overturn the jug, and spill the drink prepared from maize? What? Have you imprudently given the flesh of a tortoise, stag, or boar, to be devoured by dogs?' Should the sick man confess to having done any of these things, 'It is well,' replies the physician, 'we have discovered the cause of your disorder. The soul of that beast having entered your body torments you even now, and is, alas! the origin of the pains you feel.' "

Let us glance a moment at the method of the old Egyptians in the Papyrus Ebers, the beginning of the vademecums of the physician,—as to the motion of the heart. We get at once on the trail of the Oregon Indian. When the breath goes in at the nose it goes to the heart and the rectum and such like vessels of the body and one hears it rumbling there and it is the rough wind cuts the patients insides and wherever you lay your hand on the vessels you feel the beating of the heart. When the heart sucks in water too there is trouble. Even though under one's hands this is not always evident, yet they are full of water and air. When there is bitterness in the heart the *rô-ab* (abdomen) grows large both to sight and feeling. We see the "laying on of hands" has ancient history behind it. Again we find theory interfering with diagnosis and we conjecture it is apropos of the pneuma, the rough wind. "If the heart feels a mawkishness, it is the bitterness of the heart dependent upon an inflammation of the rectum." It is not difficult to recognize across 3500 years gastrointestinal disturbances, heart burn, flatulence, in these diagnostic lessons the old Egyptian practitioner is giving to the profession of his day. In the Atharva Veda (2) of the Hindu the practitioner for bowel trouble "blows upon the rectum of the patient." In the Papyrus Ebers when the heart is sick he is instructed to blow through the hollow of his hands so the breath or pneuma penetrates the rectum, (3) as we gather from Joachim's much criticised rendering of the text and from Hearne's *Trvaels* Bancroft (4) gets his authority that among the North American Indians of the northwest coast for inward complaints the doctors blow zealously into the rectum or adjacent parts. I repeat this scrap of therapy from what appeared in these columns in another connection four or five years ago in order to preserve the contact of savage life on another continent with the ancient civilizations, and we see there as well as in Africa and Australia the diagnostician working on a theory basis in intimate connection with primitive pantheism. We meet with something more familiar in the manner the practitioner of old Egypt is advised to say when a little at loss to meet the demand of the patient for a diagnosis who has a cervical growth: "He has a tumor scrophulosus of fat causing an interference with the atut in his neck." This ought to bottle up any inquiring patient.

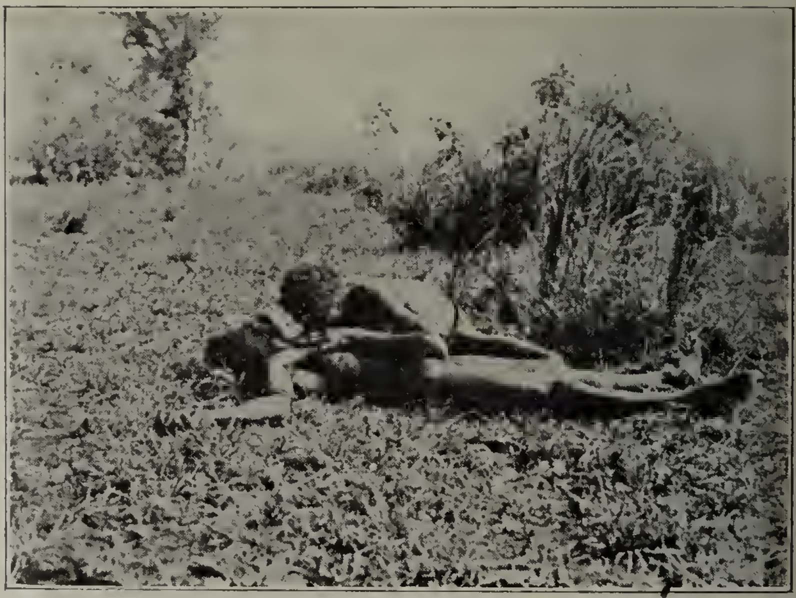

Fig. 2.—Medicine man sucking and massaging patient to withdraw girl magic. (Kakadu Tribe.)

Then we turn from oriental fakirs and occidental medicine men to Hippocrates. In some way the author of *Fractures and Dislocations* seems responsible for the book on the routine of the physician, the Iatreion or Office, the surgery of the physician.

We will find a very striking advance in the discipline if not the technic of the diagnostician in the thousand years or more which elapse between the Papyrus Ebers and the Hippocratic Corpus. "Investigate from their origin the resemblances and the differences between the diseased and the usual state of health of the patient, most marked and most easy to recognize by their manifestations; these it is furnish us with our opportunities for observation. Seek out what you can see, touch, hear, what you can find by looking, feeling, listening, smelling, tasting, and upon these turn the powers of your mind —in short use all the powers of your faculties." Could anything more tersely and completely epitomize instruction for the diagnostician in training? But to turn back to my introductory paragraphs, can we hope that we are able, pampered by physics and chemistry as we are, to use all the powers of our faculties; is it possible for us to be keyed up now to the ancient pitch of Hippocrates in all these senses and mental capacities, bare then of all accessories to assist the former, and unsupported now by the dialectic and analytical exercises which trained the latter? Our gain has been enormous, our achievements are astounding, even when we discount the innate vanity every generation carries for its ephemeral triumphs, but let us not be blind entirely to what we have lost, let us not lose altogether or too soon the point of view of the Spencerian doctrines.

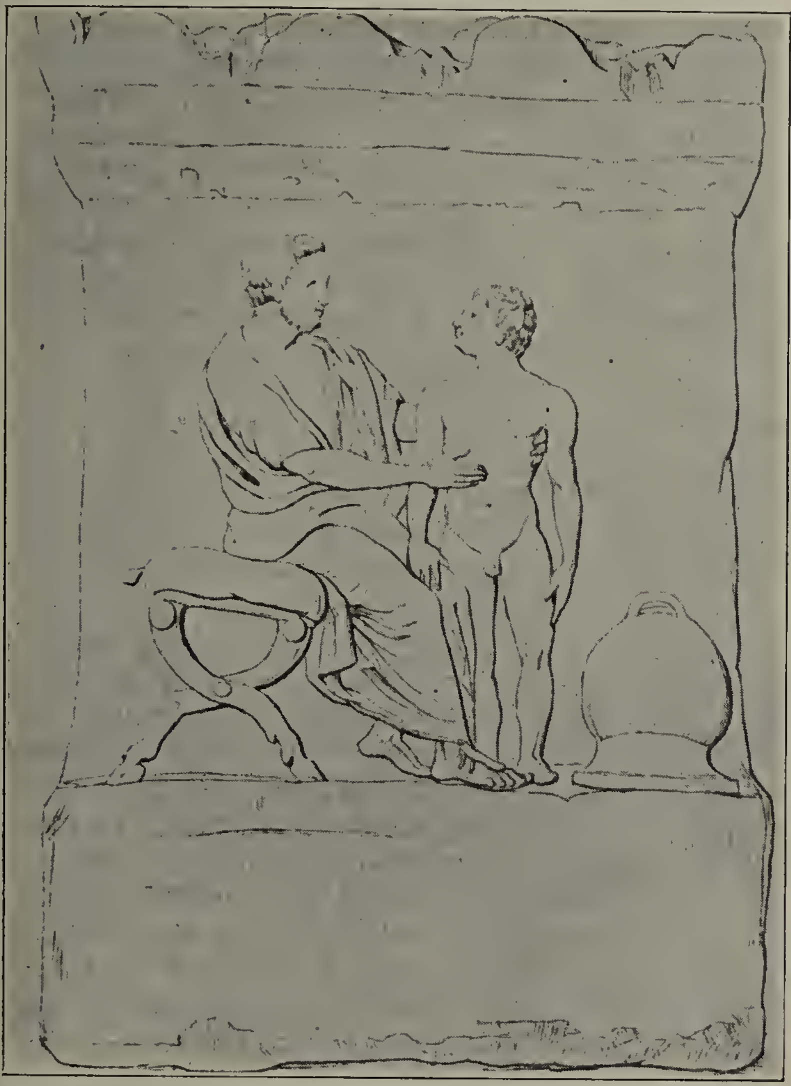

Fig. 3.—The physician Jason diagnosing a patient. From a grave monument at Acharnæ.

In the discourse of Hippocrates, at every turn of the phrase a sermon is wrapped up in a word or two. In Cicero we meet with the reflection of these pregnant precepts laid down by Hippocrates. He refers (5) to the method of diagnosis of the doctors of his day, nearly two hundred years before Galen was born. If he is attentive to his duty, he says, before he attempts to give medicine, he must know not alone the disease with which he is confronted, but the habits of the patient when well and his constitutional idiosyncrasies are to be investigated. This is a mere echo of the phrase as to resemblances and differences exhibited by the patient in health and disease and this is the first thing Galen seizes upon for a theme.

The opening sentences in the Hippocratic book on the surgery of the doctor the most inexperienced of commentators must, at the earliest date, have been able to recognize as capable of the greatest expansion, but the commentaries of Galen (6) are the first which have come down to us and by far the most extended. His diffuseness in recording his clinical experiences has been unequalled and scarcely less his acuteness of observation and the thoroughness with which he explored all the resources of Hippocratic art, and it seems singular we can find no reference to the auscultation of the chest. We read here his questioning and his cross examination of a patient in getting the account of an accident requisite fully to elucidate the physical findings in a case of dislocation downward of the head of the humerus. We get the prolixity of which he himself apparently is aware as a failing of his own, but in spite of himself his garrulity, especially when engaged in chronicling his successes, runs away with him. The first sentence in regard to differences and resemblances sets him off to remind us of Hippocrates's immortal description of the facies of death and to our disgust and annoyance he proceeds to analyze it and to point out wherein it differs from the facies of health or of a passing indisposition. It is like taking down a dictionary to explain a witticism. The perfume of it vanishes at once.

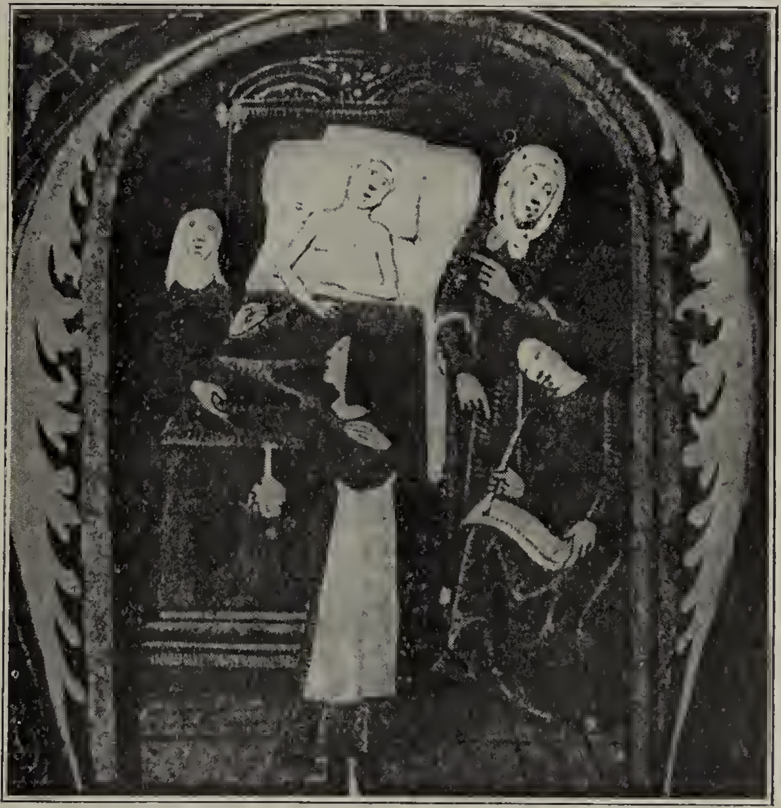

Fig. 4.—Keeping a record of the case. From a mediæval Latin manuscript of Galen.

Yet when Galen rises to a specific description of the rational signs of a dislocation of the shoulder joint it is perceived that his lack of humor and his want of artistic perception of what may be mentioned and what had better be left for the reader on which to exercise his own mental faculties, in no way contravenes lucidity in language or prevents him from making evident his quick and accurate powers of observation. One needs only to peruse his commentaries on Plato and Hippocrates to see with what gravity, with what lack of this artistic quality, he fills in the gaps these immortals left because of the artist's intuition—out of courtesy indeed to the reader, out of compliment to him, an implication of his perspicacity grateful to his selfesteem—for him to fill in. When Galen comes, either as an observer of clinical facts or even as a writer to record them, he is instructive and illuminating and his very garrulity has that species of attractiveness which is inherent in pure narrative, even when devoid of any semblance of imagination or of art. His faults as an artist, even his lack of taste as a gentleman, as well as the fruits of his active mind, he handed on to the generations who followed him for more than a thousand years and he preserved for them the fruits of minds greater than his own and taught them a reverence which has stood our civilization in good stead.

As to the case of dislocation of the humerus he tells how some chiropractors failed and he succeeded in diagnosing the state of affairs because the former had failed to elicit from the patient the fact that he had bruised one shoulder before he had fallen on the other. They had failed too to feel in the axilla. In short they had failed, and this is the criticism of leaving too much to the reader's perspicacity, they had not thought of following out for themselves the details of the axiomatic and all embracing catholicity of the Hippocratic discourse on diagnosis, if they had ever read it. They lacked not only the acuteness of observation which distinguished Galen, which might have been the fault of the gods and not their own, but they had not his thoroughness of method with its meticulous detailed care and scrupulosity, which training and industry might have given them.

I have incidentally alluded to the passage in Hippocrates concerning hydrothorax (7a) which so attracted the attention of Littré and the contemporaries of Laennec, indeed of Laennec himself. We could almost believe the Jason in the illustration (Fig. 3) was thinking of physical diagnosis and feeling for the fremitus of the friction of pleural surfaces or spying out the resemblances and differences in the respiratory movements of the two sides, as Galen taught should be done for the shoulder joint. "If you apply your ear to the chest," Hippocrates says, "and listen for a long time there is a noise as of vinegar bubbling." Again as to a patient with pyothorax (7b), "Set him on a firm chair, let an assistant take him by the shoulders and shake him and then do you apply your ear to the chest that you may know on what side the trouble is. . . . If the fluid is so thick there is no fluctuation and no noise is made in the chest, but the patient has a rapid respiration, a little cough and the feet swollen, be sure, nevertheless, the chest is full of pus." All the medical world in France, after the Napoleonic wars, had been moved by the researches of Laennec (8) on the auscultation of the chest, and by the time Littré was engaged in giving us the standard text and translation of Hippocrates, physical diagnosis had made great advances and had excited universal attention in the medical profession. Laennec had drawn attention to the passages I have already quoted, but Littré insisted that a sentence in a previous paragraph (7c), "the lung falls against the side of the chest," shows that the reference to "vinegar bubbling" is a notice of the crepitant râle. Any country boy would recognize the sound, having heard it, when straw in mouth to stick through the bung hole, he has laid his head against the barrel staves behind which the cider is fermenting. That was the sound Hippocrates was referring to. The cough and the distress in breathing we find described "and a noise is heard as of leather." Just what sound Hippocrates heard when the patient was shaken Littré is a little doubtful about, but we know that with the sound of succussion is often heard the sound of bubbling vinegar and of creaking leather if the ear is held against the chest long enough. There cannot, however, be any doubt whatever as to the general conclusion that Hippocrates was familiar with the abnormal chest sounds in disease of the lungs and their membranes, and to have referred thus plainly, but almost incidentally to them, we may well believe could only have been ventured upon by a physician who had long had opportunity to note the phenomena, and this bit of knowledge of diagnosis must have been widespread and well known. Otherwise it would, one must think, have received almost as particularized a notice in Greece at the hands of Hippocrates as it did in France two thousand years and more later.

Although Galen fully appreciated the importance of using all the sense in the service of diagnosis, as Hippocrates insisted, even though we have from Galen no commentary especially on these passages, it seems remarkable that such a thing perished after once being well known in Greek medicine, for, as Galen insisted, "the first of all things worthy of attention in the art of medicine is the diagnosis of disease." (Fig. 4.)

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It has lately come to my notice that he was preceded by Auenbrugger, Leopoldt. Inventum novum ex Percussione Thoracis Humani ut Signo.

Pluralism in Medicine and Therapeutics

By H. A. BOSMA, M.D.,
Groningen, Holland.

In daily life we see that fairly dependable regularities of sequence occur. It is these regularities that have suggested our law or supposed law of causality. If a stone of a certain weight is flung against a window pane with a certain force, the glass breaks, and we expect that glass of the same thickness and equal constitution will be broken every time a thrower with equal force flings a stone of the same weight. On this hypothesis medical science—granted there is such a thing—also has built its temple. Hypothesis: Why must there be a recurrence of events?

In everyday talk we frequently use the word cause, meaning thereby something like the event, the force, the thing that acts, operates, produces an effect, all anthropomorphic phrases since, strictly speaking, only human volition can produce an effect (1). Science abounds with metaphysical conceptions and terms; glibly we speak of action, interaction, influences, causes, affinity, attraction, factors, and so forth, whereas the only thing we truly know is our own feeling of causality. But this cannot be avoided; it is part and parcel of the mystery of being, and it matters not a whit, since science is chiefly for practical purposes and the acadabra of its tools is immaterial, so long as it leads to predictions and aids the human being in better adapting himself to his ever changing conditions of life. Generally speaking, we mean by cause the spark that ignites the train of gunpowder leading to the hidden depot of dynamite, the last weight that tips the scales. By habit of mind, we medical men are also inclined to picture one particular agent that is doing the mischief. Fifty years ago doctors attributed a medley of diseases to "cold," as the layman, not altogether wrongly, still continues to do at the present time. Then bacteria got into the limelight of medical attention, leaving the socalled cold in the dark. For many years the mind was *eingestellt* (set) on microbic action, until it was discovered that not every one gets tuberculosis, though all are infected. And constitutional pathology revived again. Thus the practitioner is apt to fall from one onesidedness into another, until he grasps the fact that diseases depend on an ensemble of conditions, or better, are due to a "constellation of factors," a term introduced into pathology by Prof. Tendeloo of Leyden in 1913.

In the recently published Dutch edition of his *General Pathology* written in German (2) Tendeloo discards the word cause altogether except in the sense of constellation. Every pathological change depends on a constellation of factors, both internal and external. Yet a constellation is more than the sum total of factors, one factor may influence another, or they may mutually influence one another, and this is also a part of a constellation. Several observations show that each factor has but a relative value, dependent on the constellation of which it is a part. Think of the different effects of hot air, whether dry or saturated with moisture. Of course, what is usually designated as the cause of a disease, be it a microbe, an exogenous poison, or an endogenous poison, also belongs to the constellation. In proportion as one disease producing factor is stronger, other factors lose in significance. A trifling force is needed to break an exceptionally brittle bone; a skyscraper, coming down on a man with the most solid osseous system on earth, will crack every shaft of his anatomy into fragments. But, if the morbid factor is relatively small, as so often is the case, then the oscillations of other factors of the constellation acquire a tremendous importance. It is wrong, giving rise to ambiguity and leading to therapeutic errors, to call the most conspicuous factor the cause of the disease, as, for example, a poison or an infective microbe. For pathogenic germs thrive only in a suitable soil and a poison requires a certain susceptibility to its action.

Let us remember this: Babies and old people stand opiates badly, herbivorous animals tolerate chloroform far worse than carnivorous, the maximal dose of atropine given to man is one mg., whereas one gram injected into a rabbit does not kill the animal. We consider ten mg. of morphine given hypodermically to a man of middle age, a safe dose, but I know of a practitioner in this country who, very soon after the injection of this amount, had to deplore the loss of two by no means moribund patients, and who, ever since, hesitates even to give a hypodermic injection of morphine in half the dose that is considered safe. Manquat witnessed the death of a man twenty minutes after the injection of one c. c. of pantopon; another man of sixty-five succumbed after taking 0.5 gram of antipyrine and a child of five died after 0.3 gram of antipyrine had been given in a suppository. He also witnessed two serious mishaps after the ingestion of 0.5 gram of pyramidon. That our average doses are, on the whole, still too large is the opinion of clinicians like Vaquez and Fessinger.

Why do these things happen? We do not know. We have no inkling of a suspicion even, since the various constellations met with by these poisons are unknown to us. Recent experiments may offer a clue. Strychnine, we know, has an elective action on certain portions of the nervous system. A few investigators found that it is held in combination by cholesterin, perhaps absorbed and rendered ineffective by it. We also know that the quantity of cholesterin in the blood varies in different individuals and has its fluctuations in the same individual. Thus we understand, in this case at least, why strychnine may be more poisonous to one person than to another. Oxidation, reduction, adsorption, substances in the nascent state, may all be factors that determine the ultimate fate of a poison ingested. The possibility of an internal secretion being decomposed, held in combination, weakened, intensified, or quantitively changed, should be thought of before jumping at once to the conclusion of a hypo, hyper, or dysfunction of an endocrine gland. All we know positively is that we know positively very little.

Now, if for a full understanding of a disease it is imperative to find out all the factors that make up the constellation, shall we ever succeed in knowing the etiology of diseases? Of quite a number, I believe, we never shall; we shall only arrive at a higher degree of exactness without ever attaining complete knowledge. But then we are but in accordance with the whole trend of modern science whose cocksureness and completeness is an illusion of the past. Everywhere approximate formulas take the place of absolute solutions, and the variable pushing aside the invariable more and more a summation of differences is observed and, where identity was thought to be present, only analogy turns out to exist. Science cannot find out, nor fix all conditions of a natural phenomenon. Hence, the more a man really knows, the more reluctant is he to make a prediction or a prognosis. The scientific wording, too, bears this out. It is timid in expression. The utterances of our truly scientific men, in contradiction to charlatans of every kind, are not very positive; they make their statements with all sorts of restrictions. They frequently say *ceteris paribus* and their pages abound with such hesitating terms as, it would seem, probably, perhaps, to all appearance, left for future research, and so forth. Human physiology and pathology are in this respect no exceptions to the rule. Every individual, they teach us, is a fresh problem, each a living link with blood and structures affected by a long ancestral chain; of no two persons are the fingerprints exactly alike; the chemistry of bodily cells is peculiar for each tissue; the Blazek twins, though united in body, had different passions and desires and their different susceptibility to disease became at last fatal to both. We are told nowadays to treat patients along physiological lines, but in the preface of a book of this character (3) which, by the way, I should wish to be read by every practitioner, we may read this significant passage: "When I reflect that I am now teaching the exact opposite to many of the views held ten years ago, I feel that physiology can only come to the aid of medicine with becoming modesty and without overweening dogmatism." Thus, a general pathology, useful and indispensable though it is, must always remain a rather rough scheme; a special pathology is a little more accurate but schematic still; a physiology and pathology of an individual comes nearest to truth.

The present drift in physiology and pathology is ever more towards physiochemistry and colloid chemistry and the facts of late years, brought to light by international cooperative research, are amazing and bewildering. And at least one characteristic point these investigations have revealed; the immense complexity of the living organism. It certainly does not seem as though still deeper penetration into vital problems will result in simplification of our views; on the contrary, we increasingly perceive more multiplicity and subtle shades of difference where oneness and invariability were assumed or promised. And yet, these biochemical studies do not altogether leave the final impression that all is chaos and confusion, for indeed we here and there perceive useful adaptations, correlations, a tendency towards equilibrium, though in other times we are vexed with Nature's stupidity when she is overshooting the mark and defeating her seemingly useful purpose. Variability once more.

Now it may be asked, what have these reflections to do with the practice of medicine? Just this much. Knowing that most diseases, if not all, depend on a constellation of factors, are due to a plurality of causes, it is incumbent upon us, as hygienists and healers, to aim preventively and therapeutically at as many factors as we may lay our hands on. Socalled causal treatment is too often firing one rifle, loaded with one cartridge, at one malefactor. True causal treatment is attacking any and every factor of the disease producing constellation; it is sagaciously handling the Browning and, when at our wit's end, heaven pardon me, using the shotgun. True, this treatment may become plainly symptomatic, but what about that? Many a physician, especially when young and aspiring to be scientific or nothing, feels secretly guilty of quackery, if he is not getting at the cause and only treating symptoms. This is often a misplaced selfaccusation, based on false logic. Not seldom it is difficult to locate the primary seat of disease; we only notice disturbances of various functions, in some cases there is no primary seat, nor any seat whatsoever. A strong emotion reverberates throughout the whole body, affecting every function for good or for evil. *L'organe crie sa souffrance, avant d'être lésé.* In fact, we often must treat symptoms even when we know exactly the primary seat of disease. There is the elderly patient with insufficient heart action; he is dyspneic, and his difficult breathing is aggravated by the mucus in his badly congested lungs. Of course I give digitalis, but I add to my potion some potassium iodide, caffeine, sodium benzoate and spiritus ammoniæ anisatus and I know from experience that this combination will give my patient more relief than the digitalis alone. I also attend to his stomach and bowels, although I know the primary mischief is in his degenerated heart. Let us not forget it; it is symptoms that bother the patient; to him symptoms are his disease. And by treating his symptoms also we may do him a world of good and by doing so we are acting in a highly scientific manner, for symptoms are, or may become, causes at any time.

But we must be on our guard. We by no means treat symptoms always. We certainly do not commence antipyresis with every elevation of bodily heat; we do not suppress every cough; do not stop every diarrhea; do not check every nosebleed. We abstain when Nature is wise, interfere when she is stupid. We always combat symptoms that visibly endanger life, we do not heed those that aid the *vis medicatrix*. This is what marks the good doctor; his knowing when to act, when to let go. But, whether we deal with causes, with symptoms, or with both, our art is always pluralistic, never monistic, if I may be permitted to borrow two words from contemporary philosophical thought. The human body is a psychophysicochemical cauldron, chief among which is the psychical factor. Human physiology and pathology are not those of rabbits and cats. In not a few diseases emotional influences play a predominant rôle. Our ever increasing knowledge of endocrine glands and the autonomic nervous system begin to throw light on the mechanism between body and soul. And it is quite certain that the physician's personality and his suggestive influence are, in the treatment of any disease, of the utmost significance.

Physicians of the past were well aware, too, of the mind being an important disease producing and also curative factor; besides experience had led them to adopt complicated prescriptions and to use decoctions and infusions of the whole complex flower and herb. True, their therapeusis was often sheer handling of the shotgun and, knowing little pathology, they were hitting right and left at all symptoms. But incidentally they must also have struck primary causes, for they certainly cured many of their patients. These old doctors were by no means fools. Their minds not being crammed with all kinds of theories and conceptual thought, they became the better observers and in clinical description and subtle differentiation have in our time not been surpassed. Now, the complicated prescription in itself is not to be condemned; in accordance with our pluralistic conception of cause and the significance of symptoms, the too simple prescription is neither scientific nor most efficient. And I believe a return to more complicated, but well reasoned out prescriptions, adapted to the ever changing reactions of each individual patient, is in harmony with what physiology and pathology teach us. This does not mean a reverting to the old shotgun prescription, based entirely on empiricism, but an improved modification of it, for as the old pluralistic philosopher and mystic Blood of Amsterdam (N. Y.) truly said: "The same returns not save to bring the difference."

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The Treatment of Severe Diabetes with Insulin*

By NELLIS B. FOSTER, M.D.,
New York.

To begin by estimating the number of calories which a patient needs to maintain weight and energy and then to compute a balanced diet which will furnish this amount of energy, may seem a fantastic method of treating diabetes. However, this is precisely what is being done today in the clinics where iletin is being used. Up to a year ago it was necessary in all severe cases of diabetes to reduce body weight and energy in order that a diet, too meagre to support life in a bulk of tissue, might do so in a smaller mass. In other words, it was necessary to reduce the individual to meet his scanty food supply and of course this resulted in invalidism and mere vegetative existence, terminating either in coma or death from inanition.

The specific action of insulin is notable in its effect on the sugar of the blood. After a dose of insulin the blood sugar falls. The amount of decrease is to some degree dependent upon the size of dose of insulin given, but also upon the severity of the diabetes. Individuals react differently in their quantitative response, although the general effect is alike in all. (1)

It becomes necessary then to determine with some precision the appropriate dose for each individual diabetic. An overdose may reduce the blood sugar too much and cause symptoms which are spoken of as insulin shock. This condition arises if the blood sugar falls below about .05 per cent. Coma may develop and death occur. These critical symptoms can be combatted successfully by administering promptly small doses of glucose intravenously. Recognizing this possible source of danger and understanding that a dose of ten units of insulin may have much more effect in one individual than in another, it is evident that the initial period of treatment must be conducted with some degree of exactness. In the New York Hospital we have had considerable experience and have had no case of insulin shock, and in other respects the results have been gratifying beyond expectation.

When a diabetic patient is to receive insulin the diet should be controlled in order that the amount of sugar entering the blood be uniform from day to day. With a patient on such a diet the first effect notable after insulin treatment is started is the subsidence of the glycosuria. This may be slow, requiring several days if the dose of insulin be small, or it may be rapid. I have seen the sugar disappear from the urine in a case of diabetic coma within twelve hours. The dose then was, of course, large. After the urine is free of sugar the only guide for dosage is the blood sugar. From the patient's point of view the effect of insulin is surprisingly prompt. Not infrequently within a few days there is a sense of renewed strength and energy which cannot be entirely accredited to psychological effect. This effect is quite easily understood since the sugar, which before treatment was lost to the body and excreted in the urine, under the influence of insulin is utilized for energy. In severe diabetes the urinary glucose may represent twenty-five per cent. of the energy of the food taken.

While an estimation of the degree of severity of a case of diabetes is not an essential preliminary to treatment of any kind, it is, however, often useful, first as a guide to the amount of insulin probably required, and, second, it is a basis for comparison in future observation of the patient. To meet this need we have used a rapid method of tolerance estimation which we feel has certain definite advantages. Our standard diet is milk. In the first place milk is a safe diet for a diabetic during the first few days of study. Next, it is fairly uniform in composition and is easily measured. We give one litre of milk a day for three days. This diet represents forty-three grams of protein, forty of fat and fifty-one of carbohydrate, according to the analysis of our milk. During the third day of this period the urine is collected as a twenty-four hour specimen. The total glucose and nitrogen are estimated in this specimen. Since a patient may catabolize more protein than the amount taken in his food, we cannot use the food protein as a basis for estimating the sugar derived from protein. It is well known that severe diabetics may catabolize their own muscle tissue. For example, during fasting there is a daily excretion of five to ten grams of nitrogen in the urine and this represents from thirty-one to sixty-two grams of protein. The urinary nitrogen tells the actual protein catabolized regardless of its source. Each gram of nitrogen equals 3.6 grams of glucose derivable from protein.

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*An address delivered before the Syracuse Academy of Medicine.

Nitrogen x 6.25=protein.
58% of protein is converted into glucose.
6.25 x .58=3.6.

Let us use a concrete case in which milk was the only food given during the tolerance test. One litre of milk in this instance contained protein, 33 g.; fat, 41 g.; carbohydrate, 51 g. The twenty-four hour urine contained 6.21 g. of nitrogen and 63 g. of glucose. It is at once evident that this patient is excreting more glucose in the urine than there is carbohydrate in the food. What is this tolerance?

(N) 6.21 x 3.6=22.3 g. (glucose from protein).
The available carbohydrate in the diet is the 22.3 g. (from protein) + 51 g. (sugar in milk)=73.3 g.
Tolerance=73.3—63.9 (urinary glucose)=9.4 g.

This computation is made from one of our cases and represents a very severe type of diabetes. It must be evident, too, that no measure of tolerance, i. e., severity, is possible without taking the protein metabolism into consideration.

As I have already said, the determination of the tolerance of the patient is not absolutely essential but it is of great interest for future comparisons. Now, in building up the diet, attention is first given to the amount of protein food because protein is the indispensable food for which no other can be substituted in the body. The ordinary processes of life cause a breaking down of cells and of tissues, and these cells and tissues must be replaced. The peculiar element in all cells is protein. The minimal amount of protein required by an adult is approximately 0.6 gram to the kilo of body weight. It is advisable that there be some margin and on this account a slightly larger amount than 0.6 gram is desirable. We usually estimate that about 0.8 gram of protein to the kilo of body weight is the correct ration.

Suppose then, that the patient weighs one hundred pounds, which is equivalent to forty-six kilos. Thirty-seven to forty grams of protein would be the first determination. If the patient is to be on insulin treatment, we need not be too economical in the amount of protein allowed.

In the beginning, we may decide on sixty grams of carbohydrate as the initial allowance. The amount of fat to be given can be definitely determined since the complete combustion of fat to carbon dioxide and water is dependent upon the amount of carbohydrate that is burned at the same time. It has been determined in the last two years that one gram of carbohydrate will effect the complete combustion of 1.5 gram of fat. In estimating the carbohydrates we must take into consideration, also, the carbohydrate derivable from the protein. In the calculations given above, 23.2 grams of carbohydrate result from protein disintegration (40×58 per cent.). 23.2+60 (the carbohydrates in the food)=83.2, total carbohydrates of food.

Using this figure as a basis for our carbohydrate-fat ratio, the fat of the food should total about 124 grams. This diet will be equivalent to about 1,500 calories. The adult diabetic who would be, in all probability, underweight if he weighed but 100 pounds, would have a metabolism below normal. On the basis of thirty-three calories to the kilo of body weight he would not require more food than this. In other words, the food represented in such a diet formula as protein forty grams carbohydrates sixty grams, fat 124 grams, would represent a maintenance diet and would be an advantageous one with which to start treatment with insulin.

If the tolerance of such a patient were as low as the case illustrated above, of course there would be a marked glycosuria unless insulin were given, but with the aid of insulin the glycosuria can be easily controlled. To illustrate the considerable increase of calories which may result in a diet by even slight increases in carbohydrates, take the following table:

TABLE A: DIET COMPUTATION.

Protein	*Carbohydrate*	*Fat*	*Calories*
24 g.	30 g.	85 g.	980
24 g.	40 g.	108 g.	1128

You will notice in this table that the proteins are the same in both diet formulæ, that the carbohydrate is increased by ten grams in second, but on account of the considerable increase of fat made possible by this slight increase in carbohydrate a marked increase of calories results. It is true that in many cases fat can be given in the diet in excess of the ratio of 1.5 grams of fat for each gram of carbohydrate without there developing ketonuria or any evidences of acidosis. This is due to the fact that diabetic patients who are very markedly undernourished have the power of storing fat in exceedingly large amounts. The tissues seem, under some circumstances, to imbibe fat in something the same way that they may imbibe water after periods of water deprivation. Fat that is stored does not enter into the metabolism; that is, it is not burned, and on that account does not act as a precursor of the ketone bodies.

There remains to determine the amount of insulin required to control the glycosuria which will probably develop in severe diabetes when the patient is placed on a diet like that outlined above. It is impossible to tell in the beginning how much insulin will be required. On this account, one usually begins with rather smaller doses than it is expected will be needed. If the urine is carefully watched during the first two days, *not as twenty-four hour specimens but each separate voiding,* a guide may be had to the effectiveness of the insulin dosage. One may be sure that the amount given is not excessive so long as sugar remains in the urine. The moment, however, that sugar disappears from the urine there is no guide except the blood sugar. In beginning insulin treatment, one might decide on a dosage of five units three times a day, to be given about half an hour before meals. If it were found on observation during subsequent days that considerable amounts of sugar were being excreted in the urine, then the dose of insulin should be gradually raised. On the other hand, if, after twenty-four or forty-eight hours, sugar should disappear from the urine, then the dose of insulin must be promptly diminished, or possibly it may have to be stopped entirely for a period of six to twelve hours, at the end of which treatment is reinstated on a smaller dosage as sugar again reappears in the urine. Considerable experimentation is required with each case in order to determine just what amount is necessary to care for the diet and not allow more than traces of sugar in the urine and at the same time not be excessive enough to run the risk of producing a fall in blood sugar to a dangerously low level. There is no rule that can be given in determining this dosage since with some cases five units seem to have as much effect in the combustion of carbohydrate as twenty-five units have in another case.

It is notable in what has already been said that the iletin treatment has caused a wide departure from the standards of scientific treatment which prevailed a year or so ago. Under the old treatment, we regarded it as a mistake to have any sugar in the urine. Some authorities went so far as to endeavor to secure normal blood sugar as well as a sugar free urine. It became evident when we began to use insulin that we must abandon the attempt to maintain a normal blood sugar because the latitude between the normal, fasting blood sugar of 100 to 120 milligrams, and the dangerously low blood sugar of 50 milligrams, was so narrow that slight errors in dose or slight changes in the patient's condition might at any time precipitate insulin shock. In fact, that is what did occasionally occur and caused the change in the procedure. As a result of this experience, many of us now feel that with patients on iletin treatment and not under constant observation, the safest condition is to have constantly a trace of sugar in the urine, the ideal being about 0.1 per cent. The reason for this "buffer sugar" is that when this is present we are confident that the blood sugar is something above 160 milligrams (the renal threshold). Certainly, in many cases, it may be considerably above this. Whether this is a desirable state of affairs in itself, is questionable. But we are presented with the dilemma of running the constant danger of having a patient manifest shock or the alternative of countenancing a persistent glycosuria.

Insulin can be given, as I have said, three times a day before meals. The reason for selecting this time is in order that the absorption of the insulin into the blood stream will coincide approximately with the increase of blood sugar produced by the intake of food. In some patients we find that two doses of insulin a day, one before breakfast and one before supper, meet the desired end, and in a few patients we have succeeded in reducing the dose to one single administration, either in the morning or in the evening. It is obviously desirable to make the number of injections as few as possible, not only on account of the convenience to the patient but also because there are relatively few skin surfaces of the body suitable for hypodermic injections and when these are being given two or three times a day, the problem of a suitable site may become serious.

I wish to give two specific cases which illustrate not only the efficacy of insulin in the treatment of severe diabetes but also tell better than any explanation can do the method of its use.

CASE I.—The patient, M. T., had been a severe diabetic for several years. He was a man forty-two years old and had gradually lost tolerance in spite of intelligent and faithful care. At the time he came under our observation he weighed eighty-seven pounds. His tolerance, as estimated according to the procedure outlined, was thirty-three grams. On a diet containing forty grams of protein, forty-five grams fat and fifty grams carbohydrates he excreted forty-two grams of sugar in his urine.

CHART I.

	Diet				*Units*	*Urine*		*Blood*		
Jan.	*C*	*P*	*F*	*Cal.*	*Iletin*	*G* *Gram*	*K*	*G* *Mg.*	*CO*$_2$	
1.	50	40	45	760	0	43	+	272	48	Ur. N=7.2× 3.65=26
8.	20	40	100	1140	9	8.7	0			26+50=76—43=33 T=33
9.	20	40	100	1140	9	8.5	0	185	54	
11.	20	40	100	1140	9	0	0			
15.	40	50	120	1440	15	0	0			
16.	40	50	120	1440	15	0	0	160		
17.	40	50	120	1440	15	0	0			
19.	40	50	120	1440	15	0	0			
20.	60	50	130	1610	15	0	0			
21.	60	50	130	1610	15	0	0			
22.	70	50	140	1740	15	0	0			

It will be noticed from Chart I that the patient's initial diet contained twenty grams of carbohydrate, and one hundred grams of fat, and on this diet his urine became sugar free on the third day with the aid of nine units of iletin a day. The diet was then raised from 1,140 calories to 1,440 and the iletin to fifteen units a day. Five days later the diet could again be raised to 1,600 calories and again three days later to 1,700. In the meantime the blood sugar, G, had been reduced practically to normal. The subsequent history of this patient is that since he left the hospital he has continued to improve and his weight is now 122 pounds. His strength and sense of well being have increased even more than his weight might signify.

We have a number of patients of this type who, under ordinary circumstances, would not be able to carry on any occupation, but who are, with the aid of iletin, pursuing light occupations and making their living. It is not difficult to teach any patient to administer iletin to himself.

I have never seen a recovery from diabetic coma treated by the older methods. I have once or twice seen the patient brought back to consciousness for a matter of hours. Therefore, to me, recovery from diabetic coma to such an extent that the patient left the hospital in some semblance of health is indeed a dramatic incident.

CHART II.

	Diet				*Units*	*Urine*		*Blood*		
Oct.	*C*	*P*	*F*	*Cal.*	*Iletin*	*G* *Gram*	*K*	*G* *Mg.*	*CO*$_2$	
3.				?	70	++	+++	330	9.7	in coma
4.	50	43	50	700	100	++	+++	260		conscious
5.	50	43	50	700	70	25	++	288	37	
6.	50	43	50	700	40	19	++	304	40	
7.	50	43	50	700	100	61	++	248	44	
8.	50	43	50	700	80	44	+			
9.	50	43	50	700	60	7	+			
10.	30	40	60	820	60	4.4	0			
11.	30	40	60	820	60	0	0	150	55	

Chart II is the record of one of our cases of diabetic coma in which the patient recovered. He was brought to the hospital in deep coma and the severity of the acidosis was notable in the carbon dioxide combining power of the blood, 9.7. In just one week the urine was free of sugar and the blood sugar had been reduced to what might be called a fairly normal level with all evidences of acidosis gone. The diet in this case was subsequently raised considerably and the patient accordingly gained weight and strength and left the hospital in splendid condition.

We have had seven cases of recovery from diabetic coma.

Another field in which insulin has proved of greatest help is in the treatment of diabetes with surgical complications. One of the commonest instances that come to my observation is severe infection requiring surgical treatment in diabetic subjects. These cases present a serious surgical hazard. [The mortality under the older methods was over seventy-five per cent.] From the history, it may be judged in many cases that the diabetic state has been of long duration and is not severe. These patients are often stout, sometimes even obese. When an infection occurs there is at once a marked increase in the severity of the diabetes as a consequence of the infection. The fever becomes an added factor in speeding up metabolism. The result is a serious infection in a severe diabetic. The mortality in these cases has always been high. If the patients are not operated upon they are sure to die. If they are operated upon they probably will die. Ether increases the hyperglycemia, and likewise the acidosis. Several cases of this kind that we have had the opportunity to treat with insulin resulted so satisfactorily that I think it is safe to say that could one start with insulin before operation one could be reasonably sure that the patient would not die of diabetes. An astonishing fact concerning some of these cases is that when the infection has subsided, the diabetes not infrequently turns out to be quite mild and the patient does not any longer need insulin treatment, but can be maintained quite comfortably by the older methods.

It may well be asked what necessity is there of any restriction in diet if insulin is used in large amounts. The answer to that, it seems to me, is found in the fact that insulin cannot be used in large amounts unless the patient is constantly under observation or has been under observation a sufficient length of time to determine, with some exactness, the relation of the high dosage to a definite diet. Now, if this diet is transgressed, symptoms develop analogous to those in diabetics who have had no treatment, namely, thirst, polyuria, etc.

Then, too, when the insulin dosage is high the carbohydrate dosage, too, must be constant or there will in all probability be accidents. All observers have noted that a fairly constant and definite ratio between total carbohydrate in the diet and the number of units of insulin used seems to exist for each patient (2).

This ratio is individual and varies in different cases but for successful treatment it must first be determined, then adhered to, and occasionally corrected.

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121 East Sixty-second Street.

Antipituitary Serum

A Biological Treatment of Diabetes

By C. LEGIARDI-LAURA, M.D.,
New York.

All recent efforts point toward the finding of a biological treatment of diabetes mellitus. That is why I think it is unnecessary to discuss at length the advantages of a biological treatment, as compared with the dietetic treatment, which has been tried for over half a century, and under the light of present knowledge appears to be a purely empirical method of treating this disease. Considering the bad results of partial or temporary total starvation, as tried in Europe under the authority of Cantani and Guelpa, and more recently in America under the authority of Allen, it is only natural that workers should be looking in some other direction.

Notwithstanding an enormous quantity of work, the causes of diabetes mellitus are still very obscure. Nevertheless, there are several fundamental facts which we know, at least partially, and which offer some good material. Among these facts, the most prominent is the influence of the endocrine system on general metabolism. I must note here, briefly, that diabetes mellitus is not a disease of faulty sugar metabolism alone, but in this disease all the functions of general metabolism are always more or less disturbed, although of course the disturbance of sugar metabolism is the most apparent. Now, the studies of the last quarter of a century have proved that metabolism in general is under the control of the endocrine system.

As for the special metabolism of carbohydrates there are experiments which attribute to the pancreas the most important functions of control; other experiments give predominance to the pituitary body. The influence of the thyroid in this respect is not so well defined, and the adrenals, which have been supposed for a time to have a direct bearing on sugar metabolism, have been put aside, when it has been shown that their influence was only on the mobilization of sugar, not a true metabolic process. So the pancreas and the pituitary offer the best field of research. In this country the pancreatic theory of diabetes has the greater number of followers in the medical profession, undoubtedly on account of the authority of Allen. That the depancreatized dogs become diabetic is a fact which has been established by several observers. That the pancreas is the seat of alterations in human diabetes, has not been proved, and certainly it is not likely that a pancreatic disturbance is the general cause of diabetes in man. Such distinguished men as Lepine in France, and Massaglia in Italy, have pointed out the differences of experimental diabetes and the spontaneous disease in man. Lepine (1), in 1909, affirmed that *"Le diabète pancreatique n'a que rarement son analogue dans la pathologie humaine.*

On the other hand the work done both in this country and abroad on the influence of the pituitary on sugar metabolism are also interesting. But strange to note, while the pancreas has attracted so much attention by the clinician and the practitioner, the pituitary has been confined, as far as sugar metabolism is concerned, to the experimental laboratory. Working on the experimental researches of Vassale, Massaglia, De Bovis, and notably of Cushing and Goetsch which prove that hyperpituitarism and hypopituitarism are respectively the exponents of lowered or increased sugar metabolization, I have for several years tried to find a biological method of treatment. Briefly, I worked on the following hypothesis: That the main control of sugar metabolism is the posterior part of the pituitary, that an increased production of hormones from the posterior pituitary is directly or indirectly the cause of diabetes in certain classes of patients at least, and that it is possible to counteract this overproduction of hormone.

Antihormones were first produced by Ferdinand Blum of Frankfort, using adrenal extract as antigen, and by Charles Beebe using the thyroid. With this theory I tried to produce a serum antagonistic to the pituitary, by using extract of pituitary (posterior and infundibular) as antigen, and injecting this into the horse. I have published (2) a preliminary account of my results.

The first thing that I noted was that such serum injected in man determined a decrease in blood pressure in practically every subject. This depression occurred after small doses, which was indicative that it was not due to the normal proteins of horse serum, and it occurred also without any sign of anaphylaxis. To make this interesting fact certain, I have experimented with several subjects, using normal horse serum as a control. I have also compared the action of antipituitary serum when injected simultaneously with pituitary extract and the action of horse serum similarly used with pituitary extract. From the results obtained I have no doubt that the depressive action of antipituitary serum on blood pressure is specific, or it is due to substances which are not present in the normal horse serum. That is why I feel justified in calling this product antipituitary serum and in considering it as containing special bodies which are acting as antibodies in regard to the physiological extracts of the pituitary on blood pressure.

The following cases are examples of the comparative action of antipituitary and normal serums:

Case I.—G. T., a man of forty-five years whose blood pressure (systolic) taken in different days, about the same time every day, had been oscillating between 120 and 130 with only one day out of five in which it was only 110, without interference.

The first day the blood pressure was 125; then two c. c. of normal serum were injected subcutaneously and twenty minutes afterwards the blood pressure fell to 120, and returned to 125 ten minutes later. The next day the original blood pressure was 125; four c. c. of normal serum were injected; blood pressure was 120 fifteen minutes later; blood pressure was 125 and 120 fifteen and twenty minutes later. The third day the original pressure was 120 and the injection of four c. c. of normal serum did not give any action. Twenty minutes afterward the blood pressure was 125.

It seems evident from this that in this case the injections of from two c. c. to four c. c. of normal serum have no appreciable influence on the blood pressure.

On the same patient four days after the last experiment, pituitary extract (one c. c.) was injected and the blood pressure which was 110 before the injection went up to 138, twenty-five minutes after the injection. Three days afterward the normal pressure of 120 remained unchanged after the injection of one c. c. of pituitary extract together with an equal quantity of antipituitary serum.

Comparing these findings with the definite action of antipituitary serum as it appears from the cases that I have referred to in my previous note, the difference is striking. In every case the blood pressure went down progressively, beginning about twenty minutes after the injection, and remained down twenty to thirty points and sometimes more, for several hours, or in some cases for days.

Indeed, in one case reported previously, of a patient suffering from arteriosclerosis, the arterial depression produced by this serum remained for several days.

Lately I had the opportunity of seeing another similar case which I report briefly:

Case II.—A woman of fifty years, affected by hypertension from arteriosclerosis, seen January 27, 1922. The blood pressure was originally 200. It fell to 175, twenty-five minutes after an injection of two c. c. of antipituitary serum. On January 28, 1922, the blood pressure was still as low as 170, and fell to 160, twenty-three minutes after injection of two c. c. of antipituitary serum. On February 1st the blood pressure was again 190 and went down to 170 twenty minutes after the injection.

Another case of high pressure is that of a man sixty years old, suffering from hemiparesis as a consequence of arteriosclerosis. His blood pressure went down from 190 to 160 after one c. c. and the next day it was only 170 before the injection and 135 after two c. c. had been injected.

Whether this fact can be utilized as a means of treatment for hypertension it is not yet clear to me although it might be useful in order to obtain a rapid decrease of blood pressure when this is high enough to threaten the life of the patient.

I have referred to this action of the serum essentially in regard to its physiological significance as it proves that the serum obtained from the horse, after immunization with the posterior pituitary, has antagonistic properties to the extracts of posterior pituitary. In other words, it proves that it is possible to produce a serum which contains substances antagonistic to a hormone property.

My experimental work on diabetic patients covers a period of about six years and includes at present fifty-two cases. Practically all were of long standing; none of the patients had been ill for less than one year; many for several years. Most of them had consulted several physicians, and had gone through the useless torture of dieting. Several of them have been recommended to me by colleagues who were getting tired of their cases, or were discouraged by the negative results of the diet treatment, or were willing to see the effect of an experiment of biological treatment. All the cases except three were uncomplicated. I was careful in excluding cases complicated with renal disease, especially at the beginning of the experiments, when I used large doses of the serum (five c. c. or more).

In my first cases I tested the sugar tolerance of the patients by first getting them free from glycosuria, and then allowing them a progressively increasing amount of carbohydrates *pro die* until sugar reappeared in the urine. Then I administered the serum and noted the result on the amount of sugar in the urine. If the result was favorable and glycosuria disappeared I allowed a larger amount of carbohydrate progressively until the new limit of tolerance was reached; then I gave another injection of serum, and so on. My first experiments, as published in 1919 (2) gave me a remarkable proportion of favorable cases—about fifty per cent.

At that time I considered as favorable only those cases which showed a complete disappearance of glycosuria with a full uncontrolled diet. As I became more familiar with the method I realized: First, that large doses of serum were not necessary. Second, that cases that do not respond to the first five or six injections would not respond at all. Third, that the percentage of favorable cases is higher than fifty per cent. if well conducted. Fourth, that it is unnecessary to starve the patient in order to get him free from glycosuria before trying the serum therapy.

Meanwhile the cases treated in the first series (and I must refer the reader to the paper) proved that antipituitary serum really increased sugar tolerance in a considerable number of patients. These first cases also showed me that not only glycosuria and hyperglycemia and polyuria are reduced by the serum, but that also the general condition of the patients, as well as special symptoms—trouble of vision, loss of weight, neuralgic and neuritic pains, cephalea, pruritus and other conditions were ameliorated or cured.

Let us emphasize this point: We do not cure a patient of diabetes, unless we restore to him—at least in part—the capacity of using carbohydrates. We certainly do not cure him by simply getting his urine sugar free, and his blood free from excess of sugar, if we obtain this result at the expense of his nutrition. What we purpose is to restore to him a certain capacity of metabolizing sugar and using it for the production of heat and energy.

In my first series of cases, out of thirty patients treated fourteen had such increased tolerance for carbohydrates, under the serum treatment, that the glycosuria disappeared, notwithstanding the fact that the intake of carbohydrates was notably increased. All fourteen patients were able after the treatment to tolerate about one hundred grams a day of carbohydrates, which accounts for the improvement in their general condition. Some of them could be put on free uncontrolled diet and still be free from glycosuria months after the serum treatment had been discontinued. Successive observations have shown me that some patients show occasionally a reappearance of glycosuria sometimes after a few weeks, sometimes months after the discontinuance of the treatment. When such is the case the administration of the serum for a few days makes the glycosuria disappear again.

I report here four cases which give a clear idea of what we can really accomplish by this method. One was reported in my preliminary note, and it is interesting to know what the conditions are now, two years after the last treatment.

Case III.—(Case IV of my preliminary note). G. D., a man, aged forty-six, who had suffered from articular rheumatism since his infancy and had been declared unfit for the army in Italy on account of heart trouble. His diabetic condition was discovered about three years before my first examination, which took place on March 9, 1918. His symptoms had been progressive weakness, sexual impotency, diminution of weight, almost constant headaches, and a sciatic pain which compelled him to stop working for periods of several months at a time. About a year before I examined him, he had been obliged to give up his position entirely. At the time of my examination, the patient was emaciated and very weak; the urine contained 5.10 per cent. of sugar, and the blood contained 0.46 per cent. His sugar tolerance was found to be less than thirty grams, while a diet free from carbohydrate, brought acetone and diacetic in the urine. The first injection of the serum made the urine sugar free. Then one hundred grams of white bread were added to his food for three days and five c. c. of serum were injected. Sugar in urine was 0.80 per cent. the next day. With the same diet five c. c. serum were administered and the urine was found sugar free two days after. The patient was then gradually brought to a diet containing about two hundred grams of bread a day, with no limitation of other food, while serum was injected every five to seven days until about the end of July, when the patient was found free from glycosuria and the blood sugar had decreased from 0.46 per cent. to 0.26 per cent. Meanwhile, the sciatic pain completely disappeared, the body weight increased, and general conditions were so good that on September 2, 1918, six months after the beginning of the treatment, the patient was able to reassume his occupation in a factory. According to information obtained at the date of this article, the patient is still feeling and doing well.

Case IV.—Mr. G. H., aged fifty-five years, seen by me the first time in July, 1922. Mother and eight brothers or sisters were all subject to chronic rheumatism. Fifteen years ago he had had pruritus lasting from three to four years, and was cured by dieting. He did not exclude starch and could not tell if he had at that time sugar in the urine. Two years ago he began to suffer with bad sciatic pains in the left leg. The urine was examined last November and found to contain 2.50 per cent. sugar.

The patient was placed on a diet free from starchy food, and the glycosuria disappeared, but he was feeling "miserable" as he stated, and upon partaking of farinaceous food again, sugar reappeared in urine at the rate of four per cent. The patient restricted his diet again and the urine sugar decreased, but the general condition of the patient became poor. He had not consulted a physician since last March, and on his own judgment increased the intake of carbohydrates. The general subjective condition of the patient became much better, but the sugar reappeared in the urine.

At the time of my first examination (July 26, 1922) the urine contained one per cent. sugar; no acetone or diacetic acid; faint traces of albumin. Patient appeared to be about sixty years old, was prematurely bald, and poorly nourished. On July 30th the first injection of antipituitary serum (one c. c.) was given. On August 3rd the urine contained 0.1 per cent. sugar; no acetone or diacetic acid; urea, 1.0 per cent. notwithstanding the increase of carbohydrate intake of about a hundred grams of white bread a day and thirty grams of oatmeal with milk every morning. This patient's urine was sugar free after the second injection; the intake of carbohydrates was increased every week, while the injections of two c. c. of serum were repeated twice a week. The patient was on full uncontrolled diet, had had six injections of serum in all; he was free of sugar, felt perfectly well, and the sciatica had disappeared.

Case V.—Mr. Z. G., sixty-three years old. Nothing was known about his family history. Sugar in the urine was first discovered six months previously, when he went to consult a doctor on account of an annoying frequency of urination. The sugar in urine was found to be five per cent. I saw the patient for the first time on March 26, 1922, after he had been kept for about five months on a diet free from farinaceous food, without relief from the frequent urination. On March 26, 1922, the blood pressure was 120-100. The liver was moderately enlarged. The general condition was apparently good. After a week of diet poor in proteins, and with complete exclusion of farinaceous food, the glycosuria was reduced to three per cent. On April 11th the urine still contained three per cent. sugar. The first injection of serum was administered (two c. c.) and repeated at the same dose three days afterwards. The next examination of urine showed one per cent. sugar. On April 23rd two c. c. serum was given. The urine examined on the 25th contained 0.5 per cent. sugar, no diacetic acid, no albumin. The diet was then increased with about one hundred grams of farinaceous food a day. The urine was sugar free on the 28th of April, with patient feeling well and normal frequency of urination. He had a reappearance of glycosuria on one occasion during September, which disappeared after one injection of serum. This case was not concluded although the patient felt well up to this date.

Case VI.—Mr. G. R., aged forty-eight. Diabetes was first recognized toward the end of 1914, when the sugar in the urine was above two per cent. on a mixed diet. He consulted several physicians and submitted to a starch free diet several times, but the urine never became free from sugar. The patient was recommended to me by a colleague about March, 1921. His urine was found to contain from one to 2.8 per cent. on different days on a diet free from starch. During a period of about a month, the patient had six injections of serum (two c. c. each) and the urine became sugar free.

Then the patient discontinued the treatment; he had his urine examined several times in 1921 when it was usually found free of sugar, with an occasional trace present. Patient continued on a full uncontrolled diet. Sugar reappeared in the urine about eighteen months after the patient had discontinued the treatment, glycosuria being a little above one per cent. On August 2, 1922, I administered two c. c. of serum and two days afterward the sugar in the urine was reduced to traces. The second injection was then administered and the urine became sugar free. The patient had five injections of serum up to September 20th; sugar did not reappear to the present time, although the patient had taken every kind of food *ad libitum.*

I have never noted anaphylactic shock in any of the patients. At the beginning of the experiments when I used large doses of serum, I had three or four cases of serum sickness, manifested by a rash. Later on, using only from one to two c. c. of serum, I did not notice any notable inconvenience. Of course it is prudent in using any serum in which the proteins have not been reduced in amount, first to sensitize the patient with a few drops of serum, following in an hour with the rest of the dose, also to have a one per cent. solution of adrenalin at hand to be given hypodermically if needed. With this precaution the administration of the serum is safe. Cases with serious renal complications should not be treated with the serum, unless with great care. I have never administered the serum in cases of diabetic coma.

CONCLUSIONS.

1. By treating the horse with parenteral administration of extract of posterior (infundibular) pituitary, we can obtain from the horse a serum which shows, by its effects on the blood pressure in man, to have properties antagonistic to the physiological action of pituitary extract.

2. This serum applied to the treatment of diabetic patients increases the sugar tolerance in from fifty to sixty per cent. of the patients as shown by disappearance of glycosuria with increased intake of carbohydrates. This increase in sugar tolerance in the mentioned cases is sufficiently high to give to the serum a true therapeutic value, as it enables the patient to metabolize a quantity of carbohydrate food (from a hundred grams to three hundred grams a day or more) which is sufficient to prevent acidosis, and restore the general wellbeing of the patients.

3. Of the cases of diabetes which have been treated successfully with this serum, some patients have been kept well without dietetic limitations; others are still in need of a certain limitation in the intake of carbohydrates; but none of them need to go to the extremes of complete withdrawal from food. As for the patients who did not respond to this treatment, I am positive that they did not respond to starvation treatment, i. e., that their sugar tolerance has not been permanently increased by periodically repeated starvation treatment.

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332 West Eighty-seventh Street.

The Mental Concomitants of Diabetes Mellitus*

By CLEMENT B. MASSON, M.D.,
Washington, D.C.

Although the relationship between physical and mental phenomena is conceded to be a close one, a wide gap still appears to exist in our actual understanding of the phenomena present, largely because internists and psychiatrists have not as yet developed the singleness of viewpoint which would enable one to interpret the mental in terms of the physical. More specifically we are concerned here with the type of phenomena observed in the course of disturbed carbohydrate metabolism and the mental reaction accompanying the same.

It has long been observed by others and more particularly by Halberstadt and Arsimoles that there is much confusion caused by classing all persons who are insane and have sugar in the urine as subjects of diabetic insanity. Leaving aside such elementary mental disturbances as change of character, and others which have been attributed to diabetes, and directing attention to insanity proper, there are three groups of facts which deserve attention.

First, those cases in which diabetes is only a complication or passive accompaniment of an attack of insanity. Cases of autotoxic origin and admittedly due to diabetes. And lastly, those instances in which diabetes exists and through arteriosclerosis causes cerebral deterioration.

The form of insanity is usually depression with morbid fears for the future, delusions of worthlessness, while hallucinations are not uncommon.

W. R. Rawson distinguishes two classes, one in which morbid mental phenomena have arisen in the course of glycosuria, the other in which glycosuria developed during an attack of mental disease; the former class being rare, the latter fairly common. It is to be noted how frequently authors mention melancholia as an associated mental state with diabetes mellitus. Dr. C. H. Bond states that in patients with insanity diabetes frequently develops; patients with diabetes are rarely noted to manifest a psychosis; patients with melancholia were especially subject to this complication.

Allen states that actual diabetic psychoses, i. e., psychoses which can be attributed to the diabetes as the cause, are rare. In view of the frequency with which diabetes develops on the soil of a neuropathic diathesis, the statistical conclusions that 1.2 to 1.7 per cent. of diabetic patients become affected with psychoses loses much of its value as to a direct causal relation of the diabetes to the psychosis. With an increasing quantity of sugar in the urine, frequently psychic, nervous symptoms of a general nervous nature and mostly of a neurasthenic character are observed; irritability, flaccidity, feeling of physical weakness, of lessened capacity for work, headaches, head pressure, hypochondriacal complaints. The mental disorder which is associated with diabetes is usually of a mild depressive type often with ideas of ruin and sin. Anxiety states have also been described. In general the severity of the mental symptoms may alternate with the severity of the physical disease, as indicated by the sugar eliminated. When the intoxication is great the patient may be irritable, sleepy, stupid, complain of weakness and headache.

In some subjects of diabetes, states *Le Practicien*, certain changes in the normal nature are so marked as to point to a correct diagnosis before an examination of the urine has been made. A young man, who in consequence of this disease has lost his virile power, will state the fact of his impotence to his physician with a sort of indifference, extremely different from the anxious fear displayed by the hypochondriac under like circumstances. At a more advanced stage of the disease, when the quantity of sugar in the urine is considerably augmented, the mental state changes. The patient becomes sad and is the prey of hypochondriacal forebodings. His character changes; from being free and open hearted he becomes morose and moody, speaks but little and smiles less. He becomes parsimonious and tries to cut down the expenses of his household, begins to keep exact accounts, calculates his resources and declares that he is ruined and that his family will die in the poorhouse.

The man of middle age, who, without apparent cause and without exhibiting any other mental disturbance, becomes all at once avaricious and presents delusions of rapidly approaching final ruin, is frequently a diabetic. If these melancholic forebodings continue, and if on examination the presence of sugar in the urine is established, the chances are that the patient will end his life by suicide. In the later stages, after the disease has existed for some length of time, still another mental condition is noted. The patient is lazy and wants only to be alone, he will spend hours in a state of complete mental and bodily inactivity; his mind is clear, and his intelligence is unimpaired, but he is apathetic. He has no desire to walk or talk, and seeks no occupation. Later, while preserving all his mental faculties intact, he begins to indulge in soliloquy and relates incidents and recalls old memories to himself in an undertone. Finally, he falls into a state bordering on marasmus, and is carried off usually by that most grave of the complications of diabetes—pulmonary tuberculosis.

Savage states that in insanity proper, diabetes is uncommon; diabetes and insanity run together in the same families. When diabetes and insanity coincide, the insanity is generally of the melancholic type, and the symptoms are modified by the relationship. Also quoting Maudsley (*Pathology of Mind*)—nearly all patients with diabetes with insanity were melancholic.

In one of the reports of the Medical Society of London it is stated that many psychiatrists admit of glycosuria appearing at the time of depression and disappearing with physical improvement. While their observations are of interest I do not consider their cases the same as such cases of glycosuria that sufficient attendant symptoms make the diagnosis of diabetes mellitus positive.

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*From the Acute Medical Service, Saint Elizabeth's Hospital, Washington, D. C.

An interesting tabulation of 175 cases examined within forty-eight hours of admission showed that, excepting general paresis, all the other psychoses, and three cases of diabetes, while under melancholia, six cases of diabetes were listed. In two melancholics who recovered, the improvement of their mental condition was coincident with the gradual disappearance of glycosuria.

A. Parot states that his patient had recurring attacks of melancholia which were always accompanied by a marked glycosuria. The attack under observation had as its apparent initiative a violent attack of anger. The author emphasizes the psychophysical parallelism, but unfortunately from lack of knowledge of the technic of study of the unconscious by psychoanalysis, does not develop all that might be gained. A series of cases of depression alternating with glycosuria are known, which, had the author the facts from the psychoanalytical technic to guide him would have made this extremely important problem of liver function and its mental integration clearer.

How many of the cases referred to above which are not at the involutional period, not arteriosclerotic, and not tainted with a psychopathic background, the writer has not determined, but certainly it should be considered.

Horace Victor Pike states that it is not uncommon to find patients suffering from various types of psychosis who present the clinical and laboratory evidence of diabetes mellitus, in which the glycosuria appears solely as a complication of the mental disorder. These psychoses should not be confused, however, with that more uncommon group in which the mental manifestations are unquestionably due to an autotoxemia resulting from a faulty sugar metabolism in which the psychic symptoms are typical and fairly constant.

The one case reported as being psychosis induced by diabetes mellitus is in a man aged fifty-six in which the arteriosclerotic condition must not be overlooked. From the case report diabetes mellitus might be conceded to be the cause of the psychosis. I should like to see a case in which the patient was not at the involutional period or in a senile state, where the somatic condition could be said to be the cause of the psychosis.

Quite similar observations are reported by H. Singer and S. N. Clark, who state that the type of reaction common to brain intoxications of all kinds is hallucinosis, which may or may not be associated with clouding of consciousness. The manner in which the patient reacts to sense falsifications depends upon the individual's habit of reaction. In diabetes there is more or less severe disturbance of general metabolism, which, in some cases, causes toxic brain disturbance. These cases are rare in the author's experience. The periods of acute toxic symptoms coincide with diminution of the amount of sugar in the urine. In the first case production in the amount of sugar in the urine occurred with appearance of albumin and casts, showing parenchymatous change in the kidney. In the second case the reduced sugar was noted only in connection with therapeutic efforts.

CASE I.—White woman, aged about thirty-seven, mental age eight and a half years. Previous health, up to three years ago was fairly good, showing no signs of mental disturbance. Then she began to hear voices, and became frightened; was sent to the psychopathic hospital. Diagnosis here was toxic hallucinosis, probably alcoholic. She then was sent to the insane asylum, coming under my observation. She was quiet, but mildly fearful. Bodily organs showed presence of glucose, no albumin nor casts; Wassermann reaction was negative, both in blood and spinal fluid. She weighed 135 pounds, was well nourished, and no sign of other disease was detected. After a few days apprehension disappeared, and she became a quiet, steady worker. During the next six months sugar was constantly present in from two to four per cent., but there was no further mental disturbances. Although no rigid diet was ordered, the sugar became lessened (one or two per cent.) and she was apparently well. She was allowed to return to Chicago in the care of the Mental Hygiene Society. All the symptoms returned after the first day and she was returned to the asylum. After this she became quieter, although still apprehensive, and showing signs of hallucinations. Examination of the urine showed at first two per cent. of sugar which became less and then albuminuria with hyaline and granular casts appeared. The patient's mental disturbance subsided somewhat. The amount of sugar in the urine also fluctuated. At no time was there an excess of acetone in the urine, nor was any diacetic acid found. The blood alkalinity was not estimated. As the sugar decreased in the urine, the mental state became worse.

CASE II.—White woman, aged forty-seven. Her father had been a hard drinker and manifested mental disorder at the age of fifty-eight, which persisted until his death at sixty-four; mother died at seventy, but was childish since the age of sixty-six. She had had occasional headaches, attack of chorea at age of six, which lasted one year. Married at age of thirty-two; two miscarriages; menopause at thirty-nine years. She was flighty, cranky, easily angered, and quarrelsome; some excess in alcohol. The mental disorder began six years before, abruptly; heard voices, threatening, also had uncomfortable sensations, with finally fixed hallucinations of persecution. Soon after this she was admitted to the asylum under my observation. Examination showed the patient to be quite obese, complaining of vertigo and flushing of the face. Neurological examination showed a slight Romberg's sign, with diminished kneejerk; tremor of fingers, tongue and eyelids. Her memory, recent and remote, was good; she talked freely of persecution and sensory disturbances. During the following five years, there were periods of quiescence and exacerbation. Once it was possible to send her home.

Uranalysis showed 69.75 grams of glucose in a twenty-four hour specimen, with dermatitis of perineum and thighs. Within the last two years this amount had been increased to as much as 318.09 grams in twenty-four hours. Thirst and appetite were not excessive. Restricted carbohydrate diet, lessened the sugar to between fifty and a hundred grams daily. Patient said spirits bothered her less at night after restricted diet; mental picture unchanged.

Increase in amount of sugar showed no change in attitude. On a strict Allen diet the sugar in the urine dropped from 202 grams in twenty-four hours to 8.75 grams. This decrease brought more marked complaints of sensory disturbance and hallucinations. Her expression changed to one of acute distress. Added carbohydrates brought a slight rise in the sugar content of the urine, and caused the patient to improve rapidly, so that she became quite good-natured and quiet in behavior. This was again tested later, with the result that her distress increased as the sugar decreased in amount, on full diet returning to a state of average comfort.

In fact from their report in one case at least the patient's mental symptoms seemed to be held in abeyance somewhat when fed such food that sugar was present in the urine in large amounts.

It is interesting to try and explain, why with sugar in the urine, an abnormal constitutent bespeaking disturbed metabolism, a patient should not show any change in mental status as near as I could observe, and it is still more interesting to try and explain why a patient's mental health so far as symptoms capable of being observed are concerned is better having a greatly disturbed metabolism than when this is reduced by dietetic treatment.

In contradistinction to our first class of cases of diabetes and insanity we have in the following a report of a case of diabetes in which a psychosis of short duration might be called a complication of the somatic disease.

Klieneberger reports a case of symptomatic episodic psychosis in a diabetic patient. Bonhoeffer says that psychoses based upon diabetes are rare.

CASE III.—The patient was fifty-six years old, and had been a diabetic for twelve years. He had a carbuncle which was cut, and subsequently he was admitted to the hospital. A psychosis then developed which was varying in type, and disappeared spontaneously after a few weeks. In the foreground of the symptoms were illusions pertaining to his state, thinking he was in heaven, or dead, and that he heard God's voice. There was furthermore catatonic motor irritability, with pathetic, ecstatic conditions, such as are seen in epileptics. He would constantly sing loudly, and monotonously. Stereotypy, verbigeration, incoherent rhyming, were some of the symptoms. When motor irritability set in the patient was unapproachable, lost his orientation. When these motor conditions wore off one could converse with the man. He would then try to explain his previous conduct, and give fairly good answers about his symptoms. He was in good humor throughout his psychosis, which died away gradually within six weeks. He later took up his work and was not much worried about his previous mental condition.

The paranoia existed separately, and was of a religious type. He was, and always had been, a religously inclined man, and knew the purport of his diabetic condition. He had a friend who died of diabetes, when he was admitted a third time to a hospital and who was on his mind a great deal. I see a natural connection between his symptoms during the psychotic state in the hospital and his disposition before entering the hospital. He had been worried about the carbuncle, which did not heal readily. He was afraid of dying. The exogenous psychosis created a dulling of consciousness as in the sense of a prepsychotic disposition. As soon as consciousness became clear again the hallucinations and illusions disappeared. The patient's mother had had a manic temperament, his sister was psychopathic, and committed suicide. The patient was of a manic disposition, but did not present the depression during his attack. In this case the patient had an altered metabolism over a period of twelve years, but during all this time was not psychotic.

There are, as in cancer, ulcer of the stomach, and pulmonary tuberculosis mental troubles dependent upon the organic condition, exogenic psychic disturbances. So in diabetes aside from a definite psychosis we may have less organized and less malignant mental troubles.

G. Aymes states that for some time two kinds of psychic troubles have been differentiated in diabetics. 1. Elementary mental troubles, consisting particularly of change in disposition and habitual manner of living. Disturbances of the intelligence are quite rare in diabetics. Even in diabetics in whom the changes of disposition constitute veritable elementary mental troubles, the perception of analogies, of relation between ideas, the possibility of clear and distinct concepts remains intact.

Even when they say they are ruined, lament, become avaricious in spite of their profound sadness, in spite of their rapid loss of weight, their pallor, they can still disguise their anxieties in public, attend to business affairs and appear to be quite as rational as they always were. What sometimes indicates the intellectual weakening is the difficulty which they experience in recalling the terms between which they were to judge. There can be an apparent weakness of reasoning in diabetics, when there is no real decadence of their intellectuality. Lasegne has called this "the loss of appetite for thought." The memory is most frequently touched. The troubles of memory are due rather to the fugacity and to the lack of emotional tonality of the impressions (which leave little or no trace—on the mirror consciousness) than to the difficulty of volition for the recognition and localization of these impressions. It is especially in the domain of sensibility that important modifications occur, perhaps complained of more frequently in the woman than in the man.

Frequently the diabetic presents an abnormal passivity, indifference, and hypoaffectivity for the family, which is sometimes increased by a hyperaffectivity for himself. This tendency of diabetics to become much worried about themselves, almost inaccessible to the preoccupations of others, to become avaricious, to believe themselves ruined, has been observed in a large number of patients. This indifference may be replaced or may even be accompanied by a sort of nervous erethism which shows itself through the mobility of disposition, alternative hypothermic and hyperthermic conditions. The former obtains especially in the morning in the hours which immediately precede or following rising, after meals, and after a prolonged muscular effort; the second is manifested during the occupations of the day, in family and social life, and may be different in expression; sometimes for an unimportant reason, the diabetic will exhibit a veritable transport of irascibility, during which even those dearest will be subjected to angry insults; sometimes they will show an abnormal expansive gaiety, with the tendency to be excited by their own conversation. There is in a diabetic the classical tendency to hypochondria, taking a form of analytical nosophobia, which urges the patient to discourse on the subject of his malady to the exclusion of every other subject. This hypochondria bears a direct ratio to the amount of sugar excreted. Sometimes the fear of death is mentioned —I have noticed this in two of my cases.

The erotic ideas which are frequently present in diabetic women have their origin in a pruriginous excitation, located in the genital organs, the clitoris, particularly the urethra. The consequences of this pruritus may be distressing excitation of the genitals, which leads these unfortunate women to solitary onanism. They succumb scandalized, despising themselves and hating their weakness. They may be brought, by veritable erotic impulses, to reprehensible acts, public outrages to modesty, the medicolegal importance of which can be seen. But this pruritus is never sufficient in itself to provoke real mental troubles or ideas of suicide. This secondary genetic excitation may be implicated in the impotence of certain other diabetics, who have lost all of their appetites, especially sexual desire. The existence of these modifications of sensibility necessarily bring about perturbations of the voluntary order even to the point that it is difficult to separate them clearly, and impossible to conceive of one without the others. Contour writes, "Diabetics become lazy, everything is tiresome for them, they recoil before the slightest intellectual or physical effort." My observations have confirmed the reality of these troubles; qualified to accomplish the daily round of an accustomed profession, the diabetic revolts at any change, at any attempt to orient his activity in another direction. Particularly is his power of sociability affected because he cannot restrain himself with the relative rigor of the world's conventions which require a high degree of attention, observation and mastery of one's self. From this cause springs the marked tendency to isolation which is observed in certain patients. There is a tendency to sleep in most of the patients—with insomnia in some. The latter can probably be explained by the frequent need of urination, which seems to cause a certain degree of cerebral excitation. In a few rare cases there is soliloquy. The author found in one patient aged seventy-two, a sort of automatism of speech without thought, which might more easily fall under the heading of intellectual deficiency. Six cases are reported in detail. The troubles manifested in these patients consisted especially of intellectual laziness and diminution of memory; of hypochondriac preoccupations; of changeability of temper, of emotivity, hypoaffectivity with

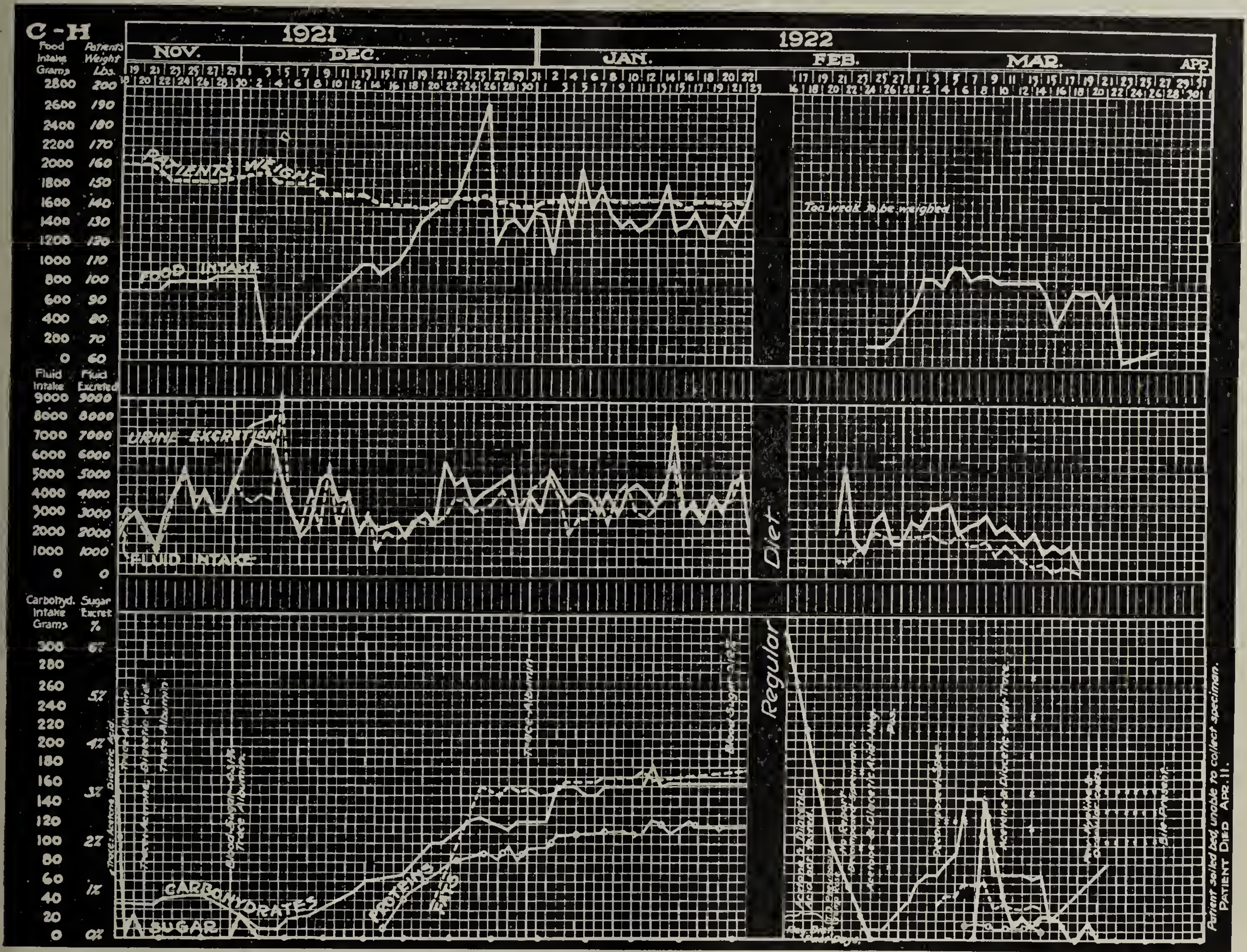

CHART I.—Showing amount of urine excreted, amount of fluid intake, carbohydrate, protein, and fats, in Case III.

egocentric tendencies, and diminution of moral and physical energies. In all the cases, special treatment was followed by variable results.

Mental troubles which are organized into veritable psychoses are rarer than elementary psychic troubles in diabetes. Insanity may exist before the diabetes; or the diabetes may exist before the insanity. In Bond's research, based on the examination of the urine of about fifteen hundred insane patients, is shown the rarity of transitory glycosuria. The only permanent glycosurias entering into the diabetic syndrome were mentioned by the family or revealed by the systematic analysis of the urine on entrance; just about six or seven in three years where there is a yearly registration of about three hundred patients. I made six observations on the relation of diabetes to mental troubles; in some, one can see the vesanic heredity, in others, this does not exist. In observation VII, the first of this group, there was no heredity; equally intense troubles accompanied glycosuria varying between 92 gr. and 64 gr. per 1,000 c. c. The antidiabetic treatment did not change the mental condition in the least. And even when this latter was improved and the patient was on a special diet, there were sixty grams of glucose to the litre in the urine. On her second admission, she had at the height of her anxious state twenty-one grams of glucose to the litre. When improved she had twenty-six grams.

Given the slight anteriority of diabetes in relation to the psychosis, these two morbid manifestations might be attributed to a general trouble of nutrition, making them simply concomitant. In observation VIII, there is the same nonparallelism, no heredity. In this case great importance must be attached to the neuropathic condition (undeniable hysterical stigmata) excellent terrain for the blossoming and development of these mental troubles. In observation IX, there was no heredity; the psychosis appeared slightly before the disappearance of the diabetic affection, and seemed to be substituted for it. These two successive disease manifestations interpreted an initial profound nutritional disturbance. Improvement during April under treatment was noted in observation X, and then nothing further. At certain times the amount of glycosuria diminished under the influence of treatment which is not at all correlative with the improvement of psychic symptoms. In observation XII there was a marked heredity; no relation between the amount of the glucose and the intensity of the mental troubles. The essential cause of the psychosis seems to be: sometimes a general disturbance of nutrition, provoking simultaneously diabetes and insanity, sometimes more or less marked hereditary predispositions, or a personal predisposition due to a manifest neuropathic condition. Cardiovascular troubles themselves certainly play an important rôle.

Of the cases that came under my personal observation the following are reported herewith:

Case III.—C. H., colored, indigent, admitted July 3, 1890, twenty-five years of age and diagnosed as chronic melancholia. The patient did not converse intelligently, seemed to comprehend some few spoken words, took no notice of his surroundings, always sat with his head drawn down. His habits were cleanly. In 1902 began working in the boiler room, continued in same condition mentally.

February 28, 1913, Dr. Dixon stated: "Patient was mute, refusing to talk either to patients on ward or answer questions. Took no interest in his surroundings and was very filthy in habits and untidy in appearance. Was very disagreeable with other patients at times. Memory was poor for recent events, fairly good for remote events. Worked at the powerhouse every day, where he rendered good service, but had to be watched to keep him from striking other patients occasionally."

Physical examination at this time revealed a large statured colored male. No evidence of any head injury. Respiratory and circulatory systems negative. The pupils were equal, round and regular. Reacted to light direct and consensual. Vaccinated February 8, 1913, against smallpox. The blood Wassermann was negative, August 5, 1915.

Up to the time of admission to the acute medical service the patient's physical condition remained good. A review of the chronic notes up to 1920 revealed that the patient remained essentially the same—stupid, quiet, working daily.

In presenting this case it may be well to give the manner in which a diagnosis was made. The patient was transferred to the acute medical service September 17, 1920 for cellulitis of the left hand with palmar abscess. To be brief, osteomyelitis of the distal phalanx of the thumb was found by x ray and the left thumb amputated by Doctor Sullivan on November 8, 1920. After an uneventful recovery the patient showed proficiency in polishing floors, hence remained in the hospital building.

Having no complaint and working about the ward quite content, little attention was paid him until it was noticed that he masturbated quite frequently and also drank large quantities of water. Upon examination the patient was found to have an elongated prepuce with a profuse mucopurulent discharge. This was negative for gonococci. Uranalysis showed sugar to be present.

To begin with the case proper: We have a tall heavy set colored man weighing 160 pounds. Appeared rather undernourished. Physical examination negative. On November 17th a twenty-four hour specimen of urine of 168 oz. or 5040 c. c. contained 4.2 per cent. sugar, specific gravity, 1.038. Otherwise the urine was negative.

The patient was placed on a vegetable diet and medication of urotropin and sodium acid phosphate and from October 21st to November 18th such treatment continued with variable results. Sugar was absent from the urine for so long a period as four days, then albumin would appear; occasionally both would appear.

On November 17th a trace of acetone and diacetic acid appeared in the urine. It was then decided to attempt entirely dietary measures, hence the Allen treatment after a fast of seventy-two hours during which time only water was given. While using a modified Allen treatment a daily chart was kept as to amount of fluid intake, amount of urine excreted, weight in grams of carbohydrate taken and the weight of the patient in pounds.

At variance with the rules of the Allen treatment seven hundred grams and five per cent. carbohydrate food per twenty-four hours was fed for five days, then eight hundred grams for six days. Upon the last day forty-five grams of protein was also added. For this twelve day period, November 18th to 29th inclusive, sugar appeared twice and albumin twice on different days, acetone and diacetic acid once. In eleven days the patient dropped in weight from 160 pounds to 153½. Results were discouraging; hence an attempt at the Allen treatment was decided upon, the reason for not adhering to it strictly being governed by the mental state of the patient from whom we could expect little cooperation.

Let us pause to consider the patient's mental symptoms from the time sugar was found daily in the urine to the present time. He remained rather mute, uttering few intelligible words; did not care to answer questions but worked constantly polishing the floors. He was untidy, masturbated frequently as he had been in the habit of doing since nine years of age. He gave no trouble in the ward other than to satisfy his great hunger and thirst he would take food from other patients' trays.

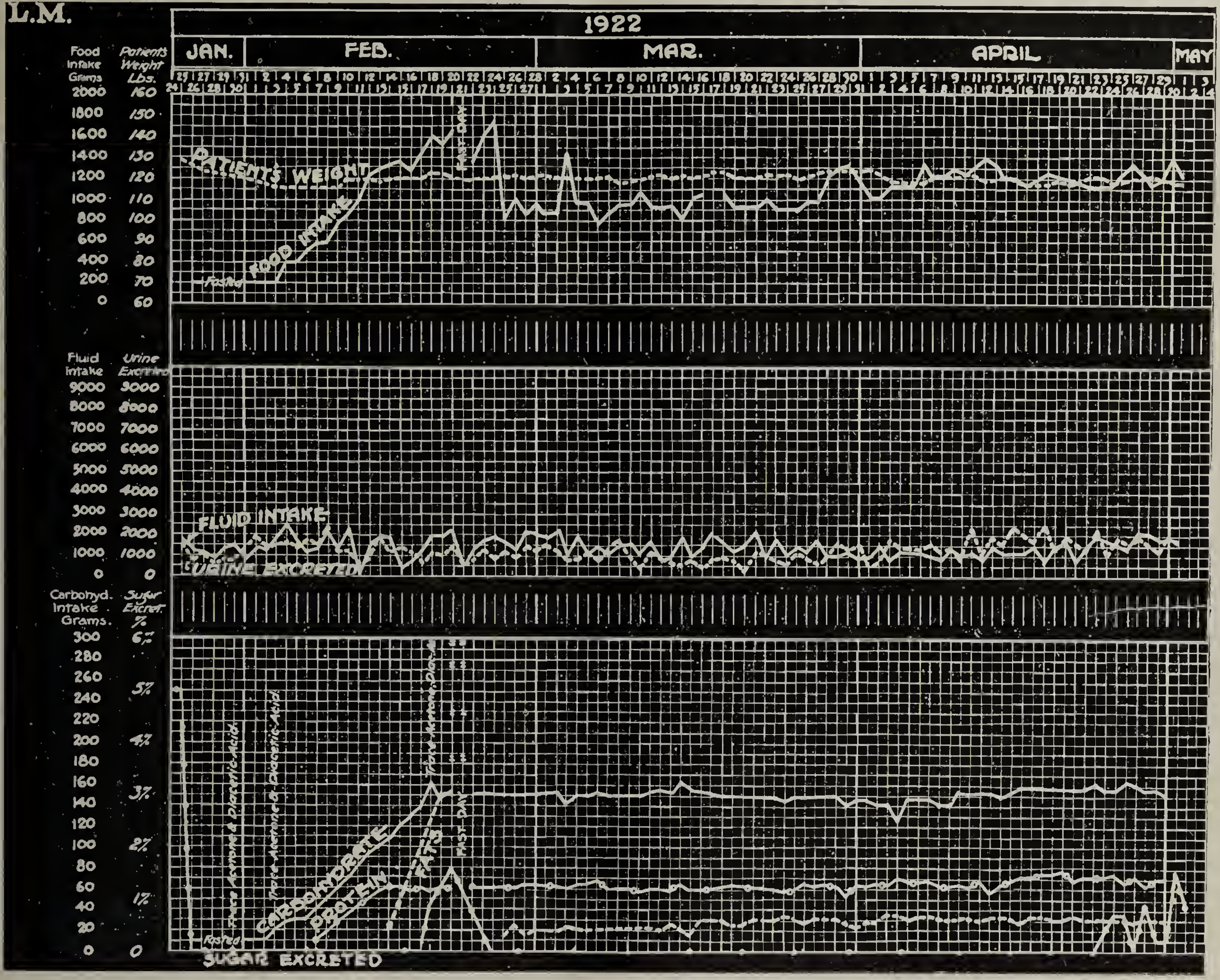

Chart II.—Showing patient's weight, food intake, fluid intake, amount of carbohydrate, protein, fats, in Case IV.

After a semifast of four days the Allen treatment was begun and since adhered to, with somewhat gratifying results. A more accurate chart had been kept. For each twenty-four hour period, the amount in c. c. of urine excreted; the amount of fluid intake in c. c.; carbohydrate, protein, and fats available in grams, gross weight of food in grams, weight of patient in pounds had been carefully noted. Blood sugar on November 30th was 0.31 per cent. The observations were upon a seventeen day period from December 3rd to 19th inclusive.

A glance at Chart I reveals a variable amount of urine excreted and a fluid intake most of the time above normal until within the last four days, December 16th, 17th, 18th, and 19th. Carbohydrate increased slowly from ten grams to eighty grams to the twenty-four hours had at no time caused a glycosuria. During the last four days protein had been added gradually in increasing amounts with impunity.

At the beginning of strict Allen treatment the patient weighed seventy kilos. Since a man at rest should get from thirty to forty calories to the kilo of body weight, the patient should have been getting 2100 calories for twenty-four hours. Instead of this he received forty calories and since then in gradually increasing amounts till on the 19th he received 512 calories. This, compared with his present weight, 21.4 per cent. of the calories value actually needed to keep up the body metabolism.

Notwithstanding that the patient was gradually losing weight at no time previous in our observation had the urine been sugar free and free from acetone and diacetic acid for as long a period as seventeen days. With the continued absolute cooperation of our patient, as far as he was concerned a negative quantity, but as to his treatment quite a positive one, hope of maintaining a good carbohydrate tolerance was entertained. Fats to the amount of 156 grams, protein 116 grams and carbohydrates to amount of 158 grams a day had been reached in his diet with no untoward symptoms, save the appearance of a trace of albumin once in the urine. The patient polished the floor vigorously each day; had a good appetite; ate and slept well and as near as can be observed was in good condition. Blood sugar, January 21, 1922, was 0.12 per cent. normal 06.-.11.

From January 23rd a careful note of the patient as regards diet was not kept. He received regular diet and continued working about the ward until his appetite became ravenous. Urine, examined at this time showed sugar present six per cent. Allen treatment begun again, February 16, 1922, but this time not successful due to the fact acute tuberculous pneumonia set in which was the cause of death, April 11, 1922.

Of interest is the pathological diagnosis from postmortem examintion: 1. Pancreatic diabetes. 2. General cerebral atrophy. 3. Acute tuberculosis pneumonia.

This case is one of proved diabetes mellitus in which the diabetes developed during the course of the psychosis and had no direct affect upon the patient's mental status.

CASE IV.—L. M. Upon admission to the hospital in December, 1913, the patient was fifty-one years of age. The urine was negative for sugar. Her medical certificate stated: "No drug or alcoholic habits in either parents or patient. Patient was of moderate disposition. Trouble began ten years ago, gradually increasing in severity. First symptoms: Hearing voices from various parts of the house. Became suspicious of everyone. Was fearful of being killed. Present symptoms: Constantly heard voices and seemed to think that someone had separated her brain into two parts and that she was being controlled by some invisible power. Probable cause: Excitement. Homicidal tendencies were marked. She had the impression that certain parties were trying to injure her and wanted to put them out of the way. Physical examination revealed a patient five feet, three and a half inches in height, weighing 133 pounds. An operative scar in the median line of the abdomen. Physical examination otherwise negative.

Further examination showed the patient's orientation for time, place and person good. Insight poor. Following an abdominal operation the patient began hearing voices day and night. Special memory tests fairly well performed.

In May, 1914, a uranalysis did not report sugar. At this time she was greatly upset by the voices; however, was neat and tidy in appearance and took an interest in her surroundings. Patient went to the sewing room for a half day, caused no trouble. From a note dated May, 1914: Patient was still hallucinated and the voices seemed to annoy her. She would carry on conversation with these imaginary people and became much excited. "They accused her of immoral conduct." Refered to the imaginary people as devils.

In July of the same year, the patient was brought to conference. Blamed her husband's employer for her troubles. Auditory, visual and tactile hallucinations annoyed her constantly. A diagnosis of a paranoid state was made in July, 1915, sugar was reported in the uranalysis. The Wassermann was negative. From the nurses' notes—Patient was pleasant and agreeable at all times, worked daily in special dining room, talked continually and fussed about the voices. Conversed with fellow patients, read and sewed. Doctor's note: Patient still reacted to her auditory hallucinations especially at night. She wanted the curtains pulled down and lights out so her enemies could not put too strong a charge of electricity on her. Lacked insight and could not be reasoned with in regard to her cystocele and rectocele.

June, 1919: Uranalysis at this time showed sugar to be present, the amount not reported. About this time nurses' notes recorded the patient as being disturbed at times, talked to herself, was tidy and attended to her personal needs. Refused to work in the general dining room, saying they didn't treat her right. Mention was made of an excellent appetite. Doctor's notes recorded the same hallucinations and mental troubles. December, 1919, a large amount of sugar was present in the urine. The patient continued up and dressed at usual hour, worked in general dining room, complained at times of feeling badly; conversed pleasantly with nurses and patients. Sleep disturbed at times. The patient continued to be delusional. During the day she was able to adjust herself fairly well to the outside environment; continued to help in the dining room, but in the evening when in her room, she was noisy, abusive and obscene in her remarks. Her delusional trend was along the line of persecution of herself and daughter. Her physical health was good although she suffered from a cystocele.

On July, 1920, patient was sent to the acute medical service for purposes of examination. Upon examination she was found to have had a hysterectomy and nothing surgical could be done for her. Patient was transferred back to her former ward. No mention was made of a uranalysis at this time.

In January, 1921, the patient weighed 140 pounds. Her attitude toward the physician was always friendly. She cursed the voices saying they were doing it all. June, 1921, the patient weighed 134 pounds; clean and neat; continued to talk to voices and remained about the same.

January 17, 1922, the patient was transferred to the acute medical service for purposes of examination and treatment, her chief complaint being bearing down pains in the pelvis.

With operative work in view, a routine analysis of urine was done and proved the presence of sugar. Sugar was present daily in the urine. On January 24, 1922, the patient was placed on Allen treatment for diabetes with good cooperation from patient. She seemed to understand her condition and was anxious to get well; worked about ward previous to beginning treatment and was quite happy although she complained of hearing voices.

During her diabetic treatment a daily chart was kept, urine excreted in twenty-four hours, fluid intake, total weight of food, available weight of carbohydrates, fats and proteins, patient's weight; sugar present in urine, etc. January 24th, five per cent. sugar was present in the urine. After a twenty-four hour fast, ten grams of carbohydrate were given for two days with such good cooperation, it was decided to fast the patient for three days, then feeding began with ten grams of available carbohydrate. Mention might be made here that no change in her mental symptoms occurred during the twenty-four hour fast period nor during the seventy-two hour fast.

Sugar disappeared from the urine and remained until the fats had, through oversight in the diet kitchen, been added too heavily to the diet. Sugar appeared in the urine six per cent. on the 18th of February and 1.0 per cent. on the 20th. With a fast day and reduced fats, the urine became sugar free on the 26th of February and remained so until the 21st of April. This day it appeared (amount not given). April 24th five per cent. sugar was reported, one and one half per cent on the first of May. The cause of reappearance was indulging the patient with white bread. Early in the treatment the patient weighed 129 pounds; lost about ten pounds and, as the chart shows, has with little variation held her weight, about 120 pounds.

Thus we have a patient first coming under daily observation with five per cent. sugar in the urine, eating well, feeling well other than a bearing down sensation in the pelvis and troublesome voices. During her first sugarfree period, January 25th to February 18th, the patient was somewhat weak, hence kept in bed, but quite in touch with all that was going on about her. Her greatest noticeable complaints were restricted diet and auditory hallucinations. She showed interest in the possibility of operation to cure her dragging down pains.

We were at this time dealing with a diabetic patient. However, previous to the onset of her somatic disturbance a certain group of mental symptoms were enumerated. She entered the acute medical service with an altered metabolism causing five per cent. sugar to appear in the urine. Notwithstanding her somatic upset of a severe grade the effect upon her mental self cannot be seen in either the increase of established mental symptoms nor the development of any new phases in her psychosis.

On February 18th sugar again appeared as related above. During this six day period metabolism was altered, but all that could be elicited from the patient was that she desired a few additional things to eat, but knew that the doctor knows best, and was willing to do without them.

For another period, February 24th to April 21st the patient was sugar free, was examined by the visiting gynecologist and found to be a nonoperative case. The uterus had been removed and a cystocele accounted for present symptoms. Patient had her same complaints, longing for sweetmeats, etc., remaining cooperative as before and eating that which was given her though she had access to more food if she chose. During this sugarfree period a blood sugar estimation on April 7, 1922, amounted to .087.

For a second time she was sugarfree, this time for nearly two months. During this period she was examined and told she was a nonoperative case for the present. She went on about her ward work, having the same interest in her relatives, asked to be transferred back to her former ward so that she might do work there as before.

For a third time she excreted sugar. The metabolism was severely altered as at first, yet no change in symptoms was elicited by daily observation of the patient.

I have been unable to note any change in the patient's psychosis during her periods of altered metabolism which could be definitely said to be dependent upon diabetes. In other words the somatic condition seemed to be a mere coincidence to her psychosis. In criticism one might say more frequent chemical blood analyses should have been done whereas only one preoperative one was done. However, daily urine examinations seem to be quite sufficient to note any serious changes in metabolism. Surely, those sufficient to cause a change in psychosis or give typical reactions in the patient's mental self.

The second case presents itself one in which diabetes mellitus is an associated condition with a psychosis of some years' standing. No direct relation between altered metabolism and mental symptoms could be observed.

SUMMARY AND CONCLUSIONS.

Needless to say before summing up the findings of the mental concomitants of diabetes mellitus that cases of glycosuria accompanying paresis are to be excluded. Whenever an abnormal condition is found in the body economy, whether it be one differing from normal in quantity or quality of reaction, internists are prone to attribute to it certain symptoms. Hence since sugar in the urine daily is an abnormal constituent bespeaking disturbed metabolism it is logical aside from finding organic derangements to look for morbid psychic changes.

It is a well known fact that certain organic diseases have a characteristic mental reaction in the individual, to wit, the well known unfounded hopeful attitude in a case of advanced pulmonary phthisis or the depressed case of advanced cancer. In diabetes mellitus we may have, aside from a definite psychosis, less organized, and less malignant psychic troubles. Among the exogenic psychic disturbances we note intellectual laziness, diminution of memory, hypochondriac preoccupations, hypoaffectivity with egocentric tendencies, and diminution of moral and physical energies.

Next let us consider the psychoses proper as associated with diabetes mellitus. First we find in the early report of these cases that patients so affected and psychotic were mostly melancholics. The literature up to the present day using different nomenclature, in the main, bears out the early findings. A depressed state of mind and a sense of ruin and worthlessness, are in the foreground in the greater number of diabetics having an associated psychosis.

However the physical and mental symptoms may be correlated, it is necessary to bear in mind three factors which play an important rôle in the development of a psychosis associated with diabetes; namely, arteriosclerosis, the involutional period and heredity. These offer excellent terrain for the blossoming and development of a mental disease.

In the first place, arteriosclerosis may be the causative factor of the patient's abnormal mental reaction. Again diabetes has a tendency to cause arteriosclerosis, in which case it would be a remote factor in the development of a psychosis. A third possibility is that the two may aid one another in the development of a psychosis. On the contrary either of the three possibilities may be present without any psychotic symptoms so that arteriosclerosis and diabetes are not the only vital factors necessary.

Secondly, the involutional period is given passing notice because of the tendency for a patient to go into a depressed state at this period. Also because the initiating factor in diabetes may be part of an internal secretory syndrome and at the involutional period there is a change in this biochemical regulating system.

Thirdly, heredity is mentioned since all the foregoing factors may be present and yet a psychosis not result in every case. It seems very logical that adding poor heredity to a case of diabetes mellitus we have added a strong psychic determinant in itself. Disregarding all other factors it is quite right reasoning from other cases of intoxication of exogenic or endogenic origin that a psychopathic taint is "the last drop in the bucket," to use the vernacular, in determining abnormal mental reactions.

Hence, when one or more of the foregoing factors are present the psychosis cannot be said to be symptomatic of diabetes mellitus without some conjecture as to what causative part the other one or more factors play.

In conclusion, it has been the observation of several clinicians that the mental symptoms in cases associated with diabetes cleared with the gradual disappearance of glycosuria. Paradoxical as it may seem one case in the literature stated that dieting caused a decrease in the glycosuria accompanied by more serious mental symptoms. These moderated when the patient was given full diet and as a result was excreting a high percentage of sugar in the urine. In others the disturbed metabolism caused no change in the mental symptoms. Cases of this kind are mentioned in the literature and the two cases studied by me were of this class. Last of all a psychosis appeared slightly before the disappearance of the diabetic affection and seemed to substitute for it. Therefore, before definite mental symptoms can be directly attributed to that form of brain intoxication accompanying diabetes mellitus, further study of selected cases with the free use of blood chemistry will be necessary.

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Surgery in Diabetic Patients

By HARRY COHEN, M.D.,
New York,
Attending Surgeon, People's Hospital.

Of all conditions that confront the surgeon for advice and remedial measures, there are none so serious as those occuring in diabetic patients. When it is considered that diabetes is a common disease and that a large number of patients so afflicted sooner or later present some surgical complication, it can be seen that a difficult problem is presented. As in all other forms of surgery, considerable advancement has been made in the treatment of such cases, and among these the most epoch making has been Banting's discovery of insulin. The object of this paper is to review the latest work on this subject and if possible to formulate and systematize the method of treatment. The paper will necessarily be divided into two parts, namely, treatment of diabetes before and after the discovery and use of insulin. We shall review first the surgical status of diabetes before the use of insulin.

The rapid strides made in the studies of the internal secretions, the studies in the physiological chemistry of digestion, the Allen treatment, the studies in the blood chemistry especially in the prognostication of diabetes by the blood sugar estimation, and the estimation of the alkaline reserve and CO_2 coefficient have all placed the disease diabetes into a position where it can relatively be kept under control. In no form of diabetes are those factors of so great an importance as in the surgical complications of this disease, and in these remarks only the surgical element will be considered.

Let us enumerate briefly all the facts that are known to the surgeon when a patient suffering with diabetes presents himself for treatment. In the first place, to quote Murphy (1), "No class of patients is more prone to surgical complications, has less tendency to recovery, and less resistance to toxic infection than the diabetic." There are various degrees of diabetes, from the very mild to the very severe, the disease being more severe in the young. Again the disease may be stationary for a long time, but any complication upsets the metabolism balance.

Under proper medical management a severe case can be transformed to a mild one and kept under control for a long time. The urine is not a true guide to the severity of the disease, but the percentage of blood sugar is. The estimation of the

CO_2 coefficient, and the alkali reserves of the body are important. Foster (2) states that patients showing a hyperglycemia of over .35 per cent. or a CO_2 combining power of less than forty per cent. cannot be expected to survive any operative procedure. The two dangers are acidosis and coma, and coma is usually followed by death. Acidosis is more often the result of disturbed proteid and fat metabolism than that of the carbohydrates.

In diabetes surgical complications occur in two forms: First, where the complication is in an acute form and assumes the rôle of the main disease, all other considerations being of secondary importance, for example, acute gangrenous appendicitis; second, in the form where the complications are not so urgent, and in these cases with proper medical treatment, the prognosis is fairly good. Also, the complications are of two kinds, either infective or noninfective, an example of the latter being a hernia or a cancer.

In the infective variety, the prognosis is more than twice as bad as in the other kind. It is an accepted fact that in diabetes the resistance of the tissues to infection is slight, due to poor blood supply, the arteries, especially those of smaller calibre, being the seat of arteriosclerosis or more frequently endarteritis causing an ischemia. Krecke (3) found arteriosclerosis in all of twenty patients operated upon by him. The result is a spreading of the infection, suppuration and gangrene. In suppuration, healing takes a very long time causing a drain on the system with disturbed metabolism, acidosis, and frequently coma and death. Likewise, even where there is no infection, the tissues do not heal quickly, but take a much longer time than do ordinary wounds.

Another consideration is anesthesia. This, however, is no longer a subject for speculation; there are now rather well established rules to be followed in these cases. In the first place, chloroform must never be used, since it causes in these cases a fatty degeneration of the liver cells and is also a strong fat solvent throughout the body, causing acidosis and frequently coma. Ether, although also a fat solvent, is less dangerous, especialy when administered by the open method. In Berkman's (4) report of 159 cases in which the patients were operated upon at the Mayo Clinic, ether was administered 104 times. The anesthetic of choice is gas oxygen, with or without ether. In minor cases local anesthetics, especially procaine, should be used. Fitz (5) cites a mortality where a spinal anesthesia was used. It is well known that acidosis of a moderate degree may be present following any operation, especially a severe one. Therefore, in operating on the diabetic, the anesthetist should use every precaution.

Though not always the case, the majority in whom surgical complications have developed, are those that have neglected dietary treatment (6). When it is considered that dietetics is an important part of the treatment and that most surgeons know only the superficial elements of this subject, it is seen how important it is for the outcome of the case to place the patient as soon as he comes under observation under the care of an internist. Only the combined efforts of surgeon and internist will give the patient that chance for a good result to which he is entitled. The judicious use of the Allen treatment has saved several of my patients.

Of the surgical complications met with, gangrene of the lower extremities are the most common. In these cases amputation above the knee, with thorough premedical treatment, offers the most hope. But even then, the prognosis is grave. Gardner (7) reports a mortality of eighty per cent. in twenty-five cases in which operation was performed by him. The same is true about carbuncles and cellulitis. Absolute surgical cleanliness is essential. As for local treatment, baking and dry dressings have yielded about equally good results with wet dressings. In some cases the application of chlorazone paste has given good results. Occasionally pituitrin, administered hypodermically in doses of one c. c., has given good results by stimulating the circulation. I do not hesitate to use morphine for the relief of pain. Alkalies must be administered judiciously, in fact their use is condemned universally. The administration of a solution of sodium bicarbonate by hypodermoclysis is mentioned here only to call attention to the fact that it is never absorbed and whenever so administered always results in an abscess.

CASE REPORTS.

Case I.—S. G., aged thirty-nine, was admitted to People's Hospital, October 1, 1918, for an extensive carbuncle on the back. There was no acetonuria. The carbuncle was excised under ether anesthesia and active medical treatment instituted. The patient was cured in three weeks.

Case II.—T. K., female, aged forty-two, was admitted to People's Hospital, October 28, 1919, with a history of mild diabetes for several years past. She had been operated upon by me for internal and external hemorrhoids fifteen months previously, under local anesthesia. She was admitted this time for profuse menorrhagia of one year's standing. Under ether anesthesia a diagnostic curettage and an amputation of the cervix were performed. Immediately following the operation there was an increase in the glycosuria and acetonuria. The pathological report showed malignancy of the uterus and eleven days later a panhysterectomy was performed. She was placed under the medical care of Dr. Bieber. Soon after the second operation all symptoms of hyperglycemia with acidosis developed. The patient became increasingly drowsy and sleepy, but never went into coma. Active medical treatment reduced the glycosuria, the acetonuria and the hyperglycemia to .18 mg. and the alkaline reserve to 53. There was an infection of the wound but with chlorazone dressings this cleared up. The patient is well today, but adheres to strict dietary regulations.

Case III.—F. F., female, aged forty, consulted me on September 7, 1920, for beginning gangrene of the left toes. Sugar in the urine was 5.8 per cent. She was referred to the internist for medical treatment and in about three months the toes were normal again, and the urine became sugar free. On December 14, 1921, a gangrenous ulcer of the right foot developed, and sugar in the urine was three per cent. She was admitted to the People's Hospital and under active medical treatment with dry antiseptic dressing there was a considerable improvement in the ulcer, but she left the hospital before she was cured.

CASE IV.—A. T., aged forty-two, referred by Dr. Z. Zimmerman, was admitted to People's Hospital, April 17, 1921, for an extensive carbuncle of the back. The carbuncle was excised and under active medical treatment the patient made an early recovery.

CASE V.—R. F., aged sixty-five, was admitted to the People's Hospital June 11, 1921, for a diabetic gangrene of the left leg. Sugar in the urine was 3.4 per cent. Under treatment the sugar was reduced to one per cent and I amputated below the knee. Discharged from the hospital in four weeks, but was readmitted on August 30th with a gas bacillus infection of the stump extending up to the thigh. There was no increase of the gangrene, the diabetes under control, but the patient died as a result of the infection.

CASE VI.—A. G., aged forty-three, was referred by Dr. F. W. Klein, May 10, 1922. She had suffered from a mild diabetes for years, and recently an extensive erysipelas had developed extending over almost the entire body. Later, there was deep suppuration of the right leg, which was incised under local anesthesia (procaine). She made an early recovery.

CASE VII.—M. W., aged forty-five, was referred by Dr. J. Weiss, May 15, 1922. She had suffered from diabetes for years, but it was always under control. Most of the time there was no sugar in the urine. An erysipelas of the left leg developed, followed by suppuration with involvement of the ankle joint. An incision was made under local anesthesia (procaine). In this case Willem's treatment was instituted. The patient made an early recovery.

CASE VIII.—The patient, aged fifty-two, was referred by Dr. F. W. Klein, July 21, 1922, for beginning diabetic gangrene of the second toe of the right foot. Sugar in the urine 3.2 per cent. Active medical treatment by Dr. Klein resulted in the patient becoming sugar free. The toe was entirely healed and normal in appearance. This case was also complicated by an erysipelas of the face.

INSULIN IN SURGICAL DIABETES.

The care and treatment of the surgical diabetic since the advent of insulin or iletin presents not an entirely new picture but a rather vast improvement on the old methods described above. Medical diabetes and surgical diabetes, although the same fundamental disease, present the same differences in their treatment as has already been described. I can bear witness personally to all the wonderful results claimed for insulin in the treatment of the medical diabetic. I know of patients in coma who have been revived and who ultimately recovered; something I have never seen before in many cases. I have also seen an almost hopeless case with a very high blood sugar, extensive acetone and diacetic acid and with impending coma, in which vigorous and thorough dietetic treatment had been tried without avail, clear up on iletin in almost a week.

We are, however, not yet out of the woods as far as surgical diabetes is concerned, and I will briefly and very superficialy outline the results I have observed in the surgical diabetics under insulin treatment. In the first place, in cases of infection, the insulin seems to be destroyed, and to accomplish results much larger doses are necessary. I have seen a patient die of spreading gangrene of the leg with infection in whom insulin was being used. I will admit the coma that developed in this case was a much milder type from which the patient could be aroused. In this case no operation had been performed. In two cases of gangrene of the leg, insulin was used and the blood sugar and urine sugar were held in check. After amputation of the affected parts, the same dose of insulin appeared to have twice the effect, with the result that these patients made recoveries.

In each of these cases the result without insulin would probably have been fatal. As remarked before, this discussion of insulin will be a brief and superficial one. I have purposely omitted the detailed description of its administration for the following reason. The administration of insulin depends on the careful study of the blood sugar, sugar tolerance, diet etc. This can best be performed by the internist with the aid of the laboratory. I have consequently left this part for the internist to be described fully.

CONCLUSIONS.

Although the chances are always against the diabetic, still with proper diet and precautions surgical complications can in most cases be avoided or reduced to a minimum. Where such complications do occur, with vigorous preoperative medical treatment by a competent internist, the prognosis is considerably improved. Gas oxygen with or without ether or open ether is the anesthetic of choice in major operations and local (procaine) in minor. The operation in every case should be thorough and the medical treatment continued. In three of my cases erysipelas was a complication. As to what constitutes active medical treatment, especially preoperatively, I leave entirely to the internist, as this is in his domain. However, for those so desiring, Kahn (8) has written an excellent article. Concerning insulin, I feel that even in the present state of its use the results are wonderful, that the results in surgical cases are excellent, but that it should be administered by an internist. I see no reason, at least for the present, for relaxing in the strict observance of the diabetic diet. I am indebted to Dr. B. Dubovsky for many suggestions in regards to insulin treatment.

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221 SECOND AVENUE.

Observations on the Nutritive Value of Pasteurized and Condensed Milk

By PHILIP B. HAWK, Ph.D.,
CLARENCE A. SMITH, Ph.D.,
and ROBERT A. LICHTENTHAELER, Ph.D.,
Philadelphia.

(From the Laboratory of Physiological Chemistry of Jefferson Medical College, Philadelphia.)

It was long ago abundantly demonstrated that milk was one of the most valuable of foods, and this importance of milk in the diet has been confirmed and emphasized by the more careful and scientific observations of the last few years. The inclusion of liberal amounts of milk in the diet has been shown to protect the individual against the possible protein, vitamine, and inorganic salt deficiency of the other foods eaten. The casein of the milk is a complete protein which supplements in this respect many common cereal foods whose protein is defective. A cereal meat diet is also deficient in the inorganic elements most needed by the body, calcium and phosphorus, and in its content of these milk excels. Vitamines A, B, C, and D are ordinarily present in milk in amounts sufficient to protect against disorders due to a deficiency of any of these in the diet.

There are, nevertheless, several reasons why the important dietary relationships of milk deserve more complete investigation. The character of the milk, especially with relation to its vitamine content, is influenced by the diet of the animal and hence generally undergoes seasonal variations, milk being generally richer in vitamines, and especially the antiscorbutic vitamine, during the summer period when good pasturage is available. Stall fed animals may produce milk rich in vitamines A and B if given suitable proportions of grains and leafy foods (1). It follows that butter produced during the summer and stored for winter use may be richer in fat soluble vitamine than fresh butter prepared from winter milk. Furthermore, it is quite possible that a condensed milk prepared during the summer may be richer in all or some of these vitamines than a fresh winter milk. Into this latter consideration, however, enters the question of the possible destruction of vitamines by the condensing process. Inasmuch as most of the fresh milk sold to the consumer has been pasteurized, the possible influence of this treatment is of interest, and the most practical idea as to the relative value of condensed milk should be obtained by comparing it with this most generally used form of milk with respect to content of vitamines, protein and inorganic salts.

In the case of infants and young children with rapidly growing bones, the inorganic metabolism is of unusual importance, and the diet must contain calcium and phosphorus in adequate quantities, in proper proportion, and in association with a vitamine found in codliver oil, butter, and certain other fats. There has been considerable speculation as to possible alterations in the inorganic composition of milk by boiling or by the lower temperature of the condensing process, as well as with regard to the influence of any such change or of the increased carbohydrate of condensed milk on inorganic nutrition. Only recently, however, with the development of animal feeding experiments, has there been much advance in our knowledge of the relationship of diet to bone growth. Many questions with regard to rickets remain unsolved, but no experimental evidence has yet been produced to show that condensed milk is not equivalent to fresh milk in the prevention of this disorder. McCollum, Simmonds, Becker, and Shipley (2) have shown that the antiscorbutic vitamine is far more resistant to heat and oxidation than vitamine A. A part of the present study was directed toward determining whether sweetened condensed milk led to any differences in the growth of the bones or teeth of rats as compared with pasteurized milk, as well as to determine the influence of a condensed milk diet on animals with well developed experimental rickets.

The ease of digestion of a milk is also an important consideration which may often overbalance minor differences in nutritive value. Undigested curds have been frequently noted in the feces as well as in the vomitus of children fed on raw or pasteurized milk. It has been shown by Brennemen (3) as well as in this laboratory (4) that these unmodified milks tend to produce large and indigestible curds in the human stomach. Boiling tends to reduce markedly the size of the curds formed. We report here experiments showing the character of the curd formation after ingestion of condensed milk as compared with pasteurized milk. We believe they throw distinct light on the special value of canned milks in infant feeding and in other connections.

ANIMAL FEEDING EXPERIMENTS.

Feeding experiments were conducted on albino rats to determine what, if any, differences existed between the nutritive values of, a, high grade pasteurized milk, and, b, sweetened condensed milk, and whether either or both of these were adequate and complete foods, especially with reference to the vitamines A, B, and D, to protein and to inorganic salts.

The plan of the experiments was to feed the pasteurized and condensed milks to groups of animals as sole foods, and if there was a failure of growth or normal bone development, to supplement this diet by the addition of any required factor. As the results show, the latter procedure was unnecessary. The findings on rickets were further checked up by experiments on rachitic animals.

Twenty young albino rats, carefully bred for experimental purposes by the Wistar Institute of Anatomy, were divided into two similar groups of ten rats each. All were female rats, and rats of the same ages and similar weights were equally divided between the two groups. The animals were kept under the best sanitary and entirely similar conditions. The experiments were carried out during the summer in order that the comparison might be made with summer milk of presumably higher vitamine content. The temperature of the animal room was kept constant except on the hottest days, when some temporary retardation of growth of all animals occurred, which was without effect on the general result.

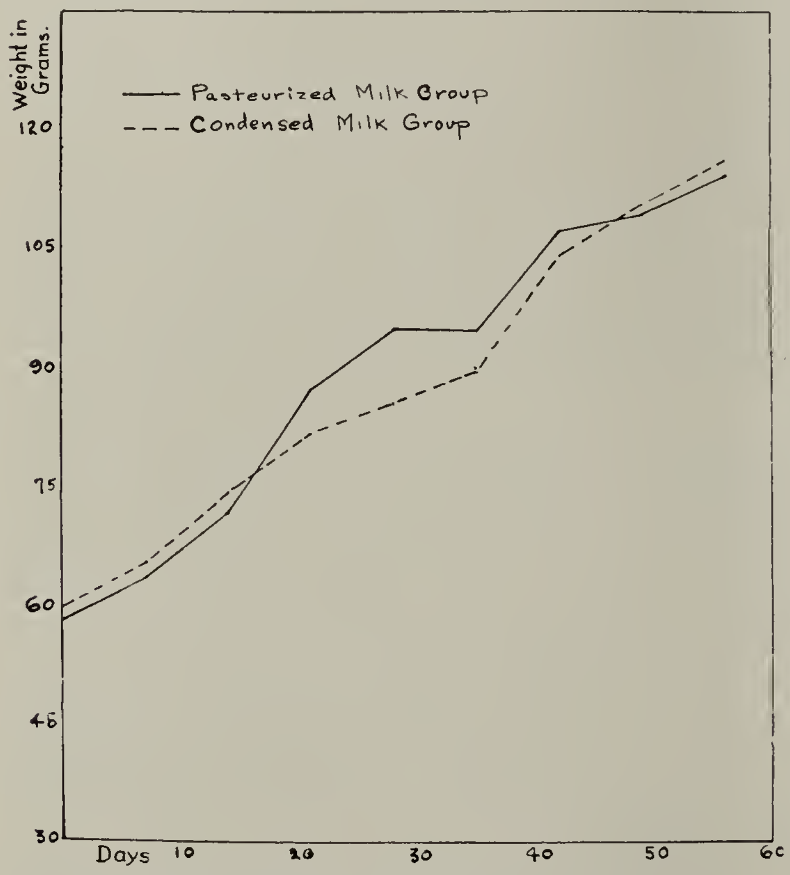

CHART 1.—Growth of rats on pasteurized and condensed milk. Average curves for ten animals in each group.

The pasteurized milk used had been heated for thirty minutes at a temperature of 60° C. It contained four per cent. of butter fat and was a better market grade, put out by probably the largest dairy supplying the city of Philadelphia and surrounding territory. The sweetened condensed milk used was diluted with two volumes of water before feeding.

All animals were weighed once a week throughout the eight weeks of the experiment. At the end of that time all animals were subjected to a general pathological examination for any rachitic tendency or any symptoms of vitamine or other dietary deficiency. Typical animals were studied more precisely; the examinations including microscopical study of the bone by an expert pathologist, of the teeth by an expert dentist, and the bones were also analyzed quantitatively for inorganic salts.

The average rates of growth for the ten animals in each group are summarized in Chart I.

It will be noted that the rats of both groups developed normally and increased in weight throughout the course of the experiment which covered the chief growing period of these animals during which any kind of milk could be expected to supply their whole needs. It has been shown that in the later periods of growth, milk must be supplemented by other foods (5).

Some differences were noted in the rates of growth of individual animals; but averaging the rates for all animals in each group, no particular differences obtained, i. e., the condensed milk rats did fully as well as those fed on pasteurized milk. Nor could any gross differences in the character of growth or development of particular tissues be noted. All animals appeared quite normal in every respect. There were no signs of any deficiency in the diet of vitamine A, vitamine B, or vitamine D, indicating that these were present in adequate amount and were presumably unaltered in amount by the treatments to which the milks had been subjected. Nor could the protein of the milk have been essentially altered in the condensing process.

It has been suggested by certain clinical writers that the inorganic content (especially calcium and phosphorus) of milk might be altered unfavorably in the condensing process or that the high carbohydrate content of this milk might in some way interfere with the metabolism of these elements in such a way as to lead to the production of rickets. Although rickets has been repeatedly produced in animals by a number of observers and on different diets, we know of no experimental support for the view that a condensed milk diet is in any way contributory to the development of this condition.

None of the animals reared by us on an exclusive condensed milk diet showed any signs of rickets when examined macroscopically. No differences could be noted in the development of bones or teeth of the animals of the two groups. As a further control, typical condensed milk rats (numbers 24 and 28 of this series), and a normal rat of similar age raised on pasteurized milk, were turned over to Dr. Edward Weiss of the pathological department for detailed and microscopical examination. The skulls of the same animals were given to Dr. Joseph Head of the dental department of the Jefferson Hospital. All animals were known to each of these observers only by number, i. e., the previous history of each rat was unknown to them.

The report of Dr. Weiss was as follows: "Autopsy on three rats, one control and two experimental, showed no gross evidence of bone change. Microscopical examination, femur of control rat. There is a regular narrow zone of ossification between the epiphysis and diaphysis. Ossification is apparently proceeding in a normal manner, both at the epiphyseal end and beneath the periosteum. The marrow substance shows no microscopic evidence of disease,

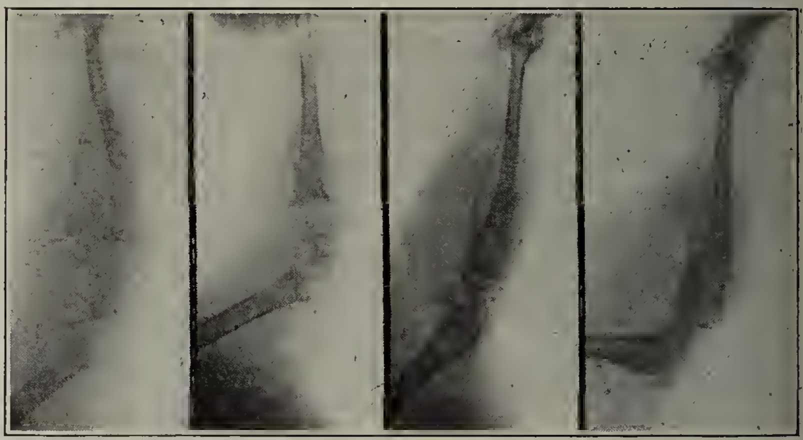

FIG. 1 FIG. 2 FIG. 3 FIG. 4

FIG. 1.—Control animal on rachtic diet.
FIG. 2.—Control animal on rachitic diet.
FIG. 3.—Rachitic animal after condensed milk feeding.
FIG. 4.—Rachitic animal after condensed milk feeding.

and the musculature surrounding this joint is apparently normal. Bone sections of experimental animals do not differ from the above." From this report it is apparent that the bones of the animals fed exclusively on condensed milk were histologically normal.

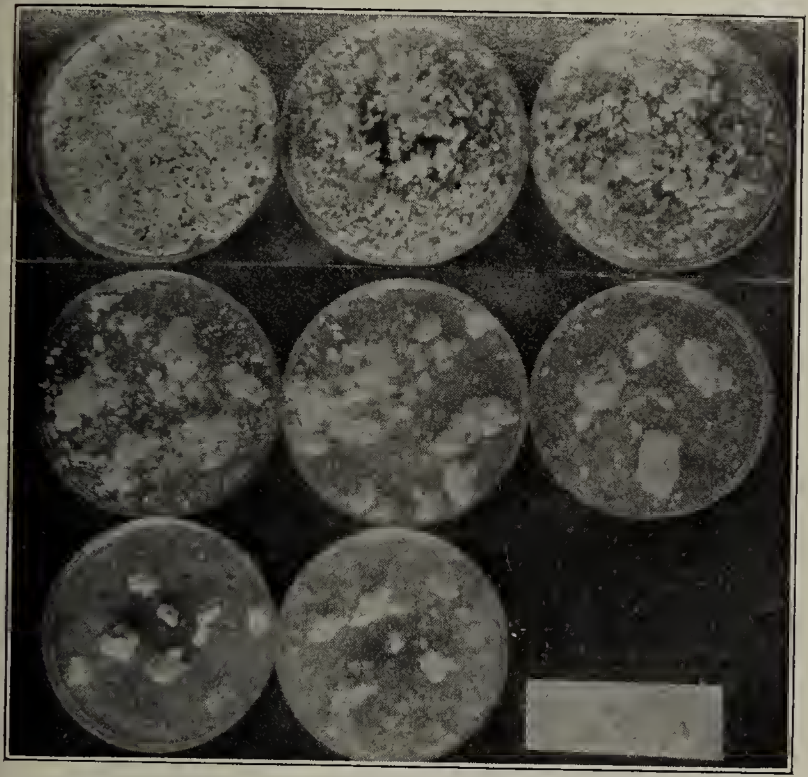

Fig. 5.—Curdling of pasteurized milk in the human stomach. Samples obtained 2.5, 5, 10, 20, 30, 40, 50, and 60 minutes after ingestion of 400 c.c. of milk.

The report of Dr. Head was as follows: "I have examined the teeth of rats number 1, number 2, and number 3 and find the teeth were firmly imbedded in healthy alveoli. The bone seemed to be of about similar strength and consistency. I find, however, that rat number 1 has much larger and better developed teeth than either rats number 2 or number 3. Rats number 2 and number 3 have teeth of approximately the same size and development, rat number 2 being a little the better."

Rat number 1 was the number 24 of our condensed milk series and number 3 our number 28, while number 2 was the control animal raised on pasteurized milk. From Table I, which gives the body weights of these animals at the beginning and at the end of the experiment, it will be seen that the rat with the best developed teeth was a condensed milk rat that had grown more rapidly than the control. Of the two rats showing teeth similar in size, the condensed milk rat was a slightly younger and smaller animal. All things considered, therefore, the condensed milk diet appeared rather better than pasteurized milk for development of the teeth.

As a further check on the anatomical findings, corresponding femurs of each of these three rats were carefully freed from ligaments, dried, and weighed. The bones were then ashed and the total ash of each determined. The results are given in Table I. It will be seen that of the two larger rats, which were of the same size at the beginning, the condensed milk rat had gained more in body weight, its bones were larger, the bones contained more ash, and a higher percentage of ash than the pasteurized milk rat. The smaller condensed milk rat, which was also a little younger than the rat fed pasteurized milk, had bones slightly smaller (but larger in proportion to weight), the bones, however, containing more ash and a higher percentage of ash.

The bones of the animals fed condensed milk only were, therefore, entirely normal in mineral content and compared favorably in this respect with the bones of a control animal fed pasteurized milk. The condensed milk evidently supplied all the requirements for normal bone growth in these animals.

It seems clear, therefore, that the condensed milk was entirely satisfactory as a source of calcium and phosphorus for the growth of bones and teeth and that no signs of rickets could be noted in animals fed exclusively on condensed milk which was as satisfactory in this respect as a high grade pasteurized milk.

It still remained to be shown whether or not condensed milk would bring about the healing of a severe rickets produced by defective diet.

McCollum and his coworkers have developed a diet which regularly leads to the production of a severe rickets in rats (6). This diet is low in phosphate and in fat soluble vitamine. It has the following composition:

Whole corn, ground	330	grams
Whole wheat, ground	330	"
Wheat gluten	150	"
Gelatine	150	"
NaCl	10	"
$CaCO_3$	30	"

In the present experiments eight young albino rats were fed on the above mentioned rachitic diet for forty days. Typical rickets developed as shown by symptoms and by the x ray photographs made of each animal. The wide bands of uncalcified cartilage at the ends of the long bones could be clearly made out in every case.

TABLE I.

ANALYSIS OF BONES OF MILK FED RATS.

Rat No.	1	2	3
Diet	*Condensed Milk*	*Pasteurized Milk*	*Condensed Milk*
Weight, beginning of experiment	74	73	60
Weight, end of experiment	138	120	108
Femur, dry weight	0.2800	0.2152	0.2060
Total ash	0.1892	0.1390	0.1406
Percentage of ash in bone	67.5	65.0	68.2
Ash, percentage of body weight	0.14	0.12	0.13

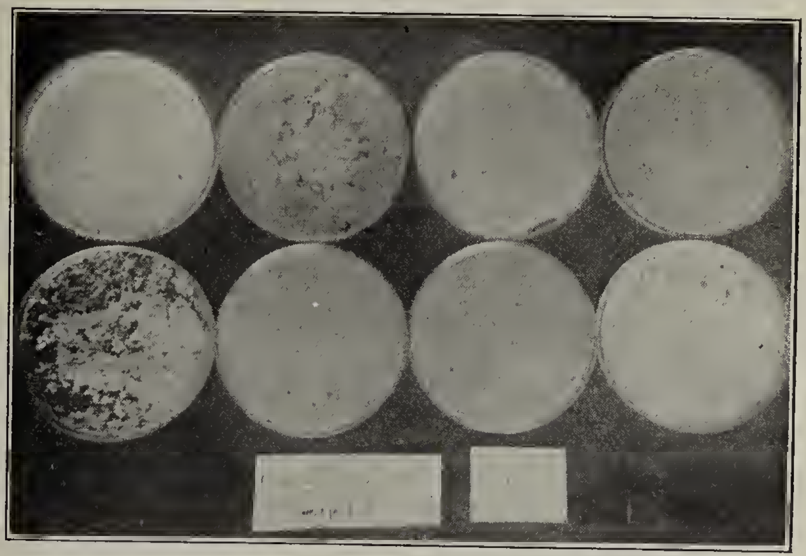

Fig. 6.—Curdling of condensed milk in the human stomach. Samples obtained 5, 10, 20, 30, 40, 50, 60, and 70 minutes after ingestion of 200 c.c. of milk diluted with an equal volume of water.

Four of the animals were left on the control diet, two were given with the control diet ten per cent. of butter, and two, five per cent. of butter; calcium and phosphorus were added to keep the percentage in the diet constant. Two were given only condensed milk for a period of seventeen days. The rats given condensed milk grew rapidly, whereas the controls made little growth. The butter fed rats were intermediate. See Table II for typical figures on control and milk fed animals. X ray examinations were made and showed the rickets to be entirely healed in the case of condensed milk rats, the uncalcified band having become completely calcified. The butter fed rats showed much less improvement. The control animals showed worse rickets than before. Typical x ray photographs of control and milk rats are shown in Figs. 1 to 4. All animals were kept throughout the experiment in a room never entered by direct sunlight. The x ray findings were checked, at the end of the experiment, by gross and microscopical examinations of longitudinal sections of the tibias.

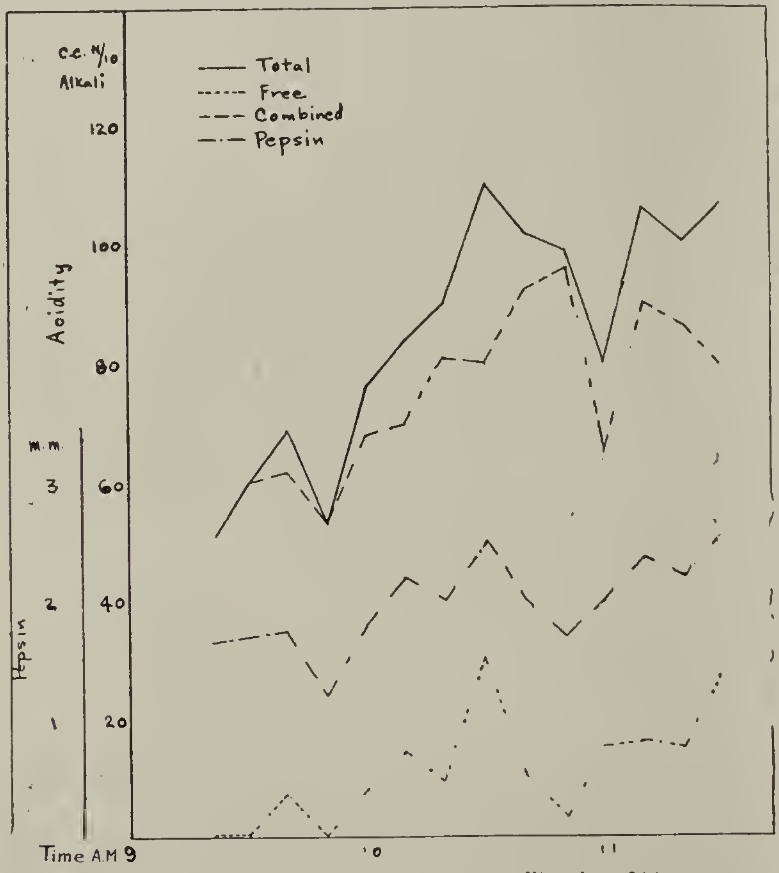

Chart II.—Two hundred c.c. condensed milk plus 200 c.c. water. Mixed 24° C.

TABLE II.

GROWTH OF RACHITIC RATS WITH AND WITHOUT CONDENSED MILK.

	1	*11*	*16*	*18*
Weight at start (grams)	52	56	58	81
Second week	58	71	71	105
Fourth week	57	74	93	112
Sixth week	52	77	92	117
	Condensed milk		*Rachitic diet.*	
Seventh week	72	83	104	120
Eighth week	95	101	105	119

Condensed milk, when given to rats with experimental rickets produced by a diet low in phosphate and vitamine D, brought about a rapid and complete healing of such rickets as shown by x ray examinations.

EXPERIMENTS ON THE DIGESTION OF MILK IN THE HUMAN STOMACH.

The coagulation of the casein of pasteurized and condensed milks in the human stomach was studied in a number of cases. In most of these cases the subject was caused to swallow a Rehfuss tube, four hundred cubic centimetres of milk being then given, and samples of the gastric contents withdrawn at intervals of from two to fifteen minutes until the stomach was empty. The curds formed with condensed milk were never so large that they could not be withdrawn through the narrow bore stomach tube. In every case with pasteurized milk nothing but clear whey could be removed, showing that large curds had been formed. Tests were, therefore, made on a subject who could regurgitate ingested milk at any desired time after ingestion and representative specimens of gastric contents were thus obtained. Typical illustrations of curd formation with pasteurized whole milk and sweetened condensed milk are given in Figs. 5 and 6.

It will be seen that pasteurized milk, like raw milk, formed in the human stomach a curd at first flocculent but soon aggregating into large, firm, and relatively indigestible curds. The condensed milk, on the other hand, yielded fine, soft curds, which did not agglomerate into masses and must hence be more easily digested by both infant and adult stomachs. Human milk we have shown forms fine, soft curds in the human stomach resembling, in this respect, condensed milk and differing markedly from raw and pasteurized cow's milk.

The course of the digestion in the stomach of condensed and fresh milks was further studied by titration of the samples obtained in the fractional analysis for free hydrochloric acid and total acidity and the determination of pepsin. The results of typical experiments are given in Charts II and III.

The chief differences between the acid curves on condensed and raw milk arise from the fact that raw milk forms large curds which then combine slowly with the hydrochloric acid of the gastric juice. The free acid is, therefore, high, and the combined acid low compared with the findings on condensed milk, which forms fine curds, combining readily with acid and leaving less free hydrochloric acid. The secretion of pepsin was fully as great on condensed as on raw milk.

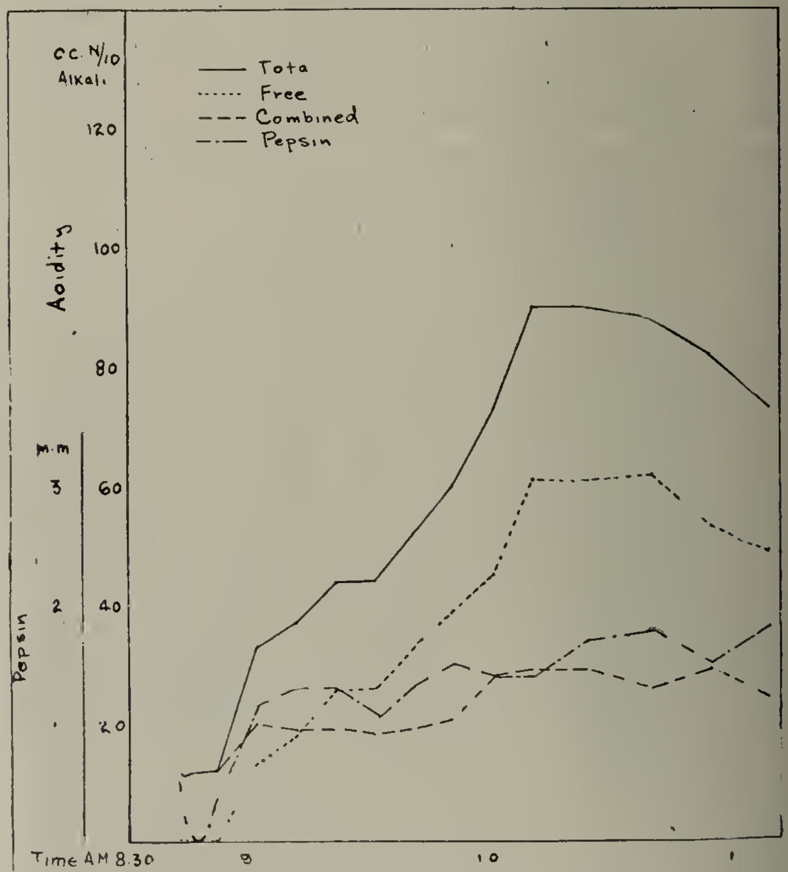

Chart III.—Four hundred c.c. raw whole milk. Temperature 20° C.

From the high combining power of condensed milk for hydrochloric acid and the low free acid figures found after ingestion of this food, we would expect condensed milk to be an especially useful form of milk to administer in hyperacidity and gastric ulcer. We expect to test out this possibility and mention it here only in the hope that others also may be led to try it out and report their findings.

SUMMARY AND CONCLUSIONS.

1. Sweetened condensed milk was found to be as satisfactory for the growth and development of albino rats as a high grade pasteurized fresh milk obtained during the summer season when such milk is generally considered to possess its maximum nutritive value. The content of vitamines A, B, and D and of protein must have been essentially unaltered by the method of preparation.

2. Condensed milk was as satisfactory for the growth of bone and the development of teeth as pasteurized fresh milk. There was no tendency towards the development of rickets. The total bone weight and the percentage of inorganic matter in the bone were at least as great on the condensed milk diet.

3. Condensed milk, when given to rats with experimental rickets, produced by a diet low in phosphate and vitamine D, brought about a rapid and complete healing of such rickets, as shown by x ray examinations.

4. Condensed milk formed finer and softer curds in the human stomach than pasteurized milk. Fractional analyses of gastric contents showed a more rapid combination of the proteins of condensed milk with the secreted acid.

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Some Points in the Examination of the Heart for Life Insurance*

By FREDERICK W. PRICE, M. D., F. R. S., Edin.,
London,
Physician to the National Hospital for Diseases of the Heart; Senior Physician to the Royal Northern Hospital, London.

(*Continued from page* 561).

When a history is elicited of a marked increase in the cardiac rate, attacks of palpitation, occurring suddenly and without apparent cause, or of dyspnea on exertion and other indications of cardiac failure coming on rapidly, we should consider the possibility of paroxysmal tachycardia. By paroxysmal tachycardia I mean a condition in which a marked acceleration of the cardiac rate occurs, which commences suddenly and abruptly and without apparent cause, lasts for a varying period, ceases suddenly and abruptly, and is due to an abnormal rhythm—the stimulus for cardiac contraction, instead of arising at the junction of the great veins with the auricle, having its origin at an abnormal point. The return of the cardiac rate to what it was prior to the paroxysm is due to the reversion of the cardiac rhythm to the normal. From the definition given, it will be seen that paroxysmal tachycardia does not include acceleration of the cardiac rate associated with the normal or sinus rhythm. The paroxysm may last for only a few beats, or may persist, more rarely, even for months.

The vast majority of cases of paroxysmal tachycardia are due to, 1, temporary auricular flutter, or 2, temporary auricular fibrillation. The rhythm may be quite regular, in which case the cause is probably an attack of auricular flutter in which there is a constant and uniform ratio ~~between~~ the auricular and ventricular rate; or very irregular, when the condition is due to auricular flutter in which the response to the ventricular contraction is at irregular intervals; or completely irregular, when the result of a temporary attack of auricular fibrillation. A characteristic feature of the condition is that with the sudden reversion of the rhythm to the normal there is an extraordinarily rapid recovery to the state in which the patient was prior to the paroxysm; this may take place even within a few hours. Polygraphic or electrocardiographic examination will put the diagnosis beyond all doubt. But frequently neither of these is available, and, therefore, we have to trust to other methods of investigation.

The most important points from the diagnostic point of view are: 1. The commencement and termination of the attack of tachycardia. The suddenness and abruptness of the onset and termination of the tachycardia are a characteristic feature—the maximum rate is attained within a few seconds, and the return of the cardiac rate to what it was prior to the attack takes place equally quickly, whereas in tachycardia associated with a normal rhythm, the onset and termination are gradual. 2. The cardiac rate. A persistent rate of over 160 is almost invariably due to an abnormal rhythm, and a persistent rate of over 140 may be due to the same cause. 3. The cardiac rate is not influenced by change of posture or other forms of physical exertion, as is the case in tachycardia not associated with an abnormal rhythm.

The term bradycardia may be used in two different senses, namely, it may be restricted to infrequent action of the heart as a whole, the auricular rate being diminished *pari passu* with that of the ventricles; or it may be employed to denote infrequency of the pulse rate at the wrist, including that due to

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*Read at a meeting of the Life Assurance Medical Officers' Association, London, January 4, 1921. The substance of this paper was published in a recent issue of the *Lancet*.

extrasystole, partial or complete auriculoventricular block, or even auricular fibrillation or auricular flutter, and the importance of this latter group of cases as causes of infrequency of the ventricular rate should be noted. I employ the term in the former sense. Using the term in this sense, bradycardia may be physiological, especially in males; in some perfectly healthy individuals the normal pulse is always infrequent, a pulse rate of 50 not being very uncommon, and, indeed, cases have been recorded of a pulse rate of 40 in a healthy individual. A pulse rate of between 50 and 60 is comparatively common among atheletes who are in training. Among the diseases in which the pathological form of bradycardia is met with are aortic stenosis, fatty degeneration of the myocardium, during the convalescence of acute infectious diseases, especially influenza, and jaundice.

The character of the pulse wave.—With regard to this, it is not necessary for me to draw attention to the diagnostic value of the "collapsing," the water-hammer or Corrigan's pulse, except to say that the collapsing character may be intensified by raising the arm above the head, and this method of examination should always be employed in suspected aortic regurgitation. But I would bring to your notice the valuable help which may be obtained from the character of the pulse wave in aortic stenosis and in mitral stenosis. The characteristic features are generally to be observed by careful palpation of the pulse, and, of course, always by the use of the sphygmograph. In aortic stenosis the pulse is sometimes very characteristic, being infrequent, of smaller amplitude, exhibiting an oblique percussion wave, and a gradual and slow summit, while to the finger the pulse is full between the beats (Fig. 2). It may be anacrotic or of the bisferiens type. A similar kind of pulse is sometimes met with in supernormal blood pressure with atheroma, and in aneurysm. Usually the pulse in mitral stenosis is small, the upstroke being short and soon attaining its maximum, the pulse wave is long, dicrotism is absent, and the pulse is full between the beats—in contrast with cardiac dilatation.

IRREGULARITY OF THE PULSE.

Irregular action of the heart in persons who may or may not exhibit evidence of organic disease is a subject of the utmost importance in the examination of the heart for life assurance. It is a problem which has been admittedly a source of perplexity and difficulty to the clinician. It was known that cardiac irregularity might signify serious impairment or disease of the heart on the one hand, or that it might be of little or no importance; for it was found that some patients lived the normal span of life without symptoms of cardiac failure, while others died perhaps after a lapse of only a few years. The difficulty arose from the fact that until recently it was impossible to determine the significance of the irregularity in any given case. All this is now changed; the problem has for the most part been solved; for it is now possible to classify the vast majority of cases of cardiac irregularity and it is known what each type signifies. We have, therefore, clear and certain grounds for purposes of diagnosis and prognosis. I would, therefore, respectfully emphasize the fact that it is not sufficient to have a question on the examination form, or to determine at the time of the examination, merely whether the pulse is regular or irregular. It is necessary to determine the type of irregularity, and we should be acquainted with the significance of each type.

All cases of cardiac irregularity, apart from comparatively rare exceptions, fall into one of six groups: 1. What is called sinus irregularity—a common type; 2, irregularity due to extrasystole, likewise common; 3, irregularity due to depressed conductivity—partial or complete heart block; 4, irregularity due to the pulsus alternans; 5, irregularity associated with auricular fibrillation, which accounts for approximately fifty per cent. of all cases of persistent irregularity of the heart; and 6, irregularity associated with auricular flutter.

In order to have a right understanding of the various forms of irregular action of the heart, it is necessary to bear in mind certain anatomical and physiological considerations: That part of the auricle which is situated at the junction of the chamber with the great veins is called the sinus part of the auricle; in it there is a small node of specialized tissue, called the sinoauricular node. There is another small node of specialized tissue situated in the septal wall of the right ventricle; this is called the auriculoventricular node. Leading from this node is a bundle of tissue connecting the auricles and ventricles, called the auriculoventricular bundle, or the bundle of His or Flack. As indicated, it arises above in the auriculoventricular bundle, and at the upper margin of the intraventricular septum this bundle divides into two branches, the right and left septal divisions, one of which goes to the right and the other to the left ventricle.

Now, when the heart is going to contract, the stimulus for contraction rises normally at the orifices of the great veins, that is, at the sinus, and it is probable that it begins in the sinoauricular node. From this point the stimulus spreads rapidly over the auricles, and auricular systole takes place. It then travels through the auriculoventricular node, along the auriculoventricular bundle, and is so distributed to the ventricles. Normally, therefore, stimulation and contraction of the sinus, auricles, and ventricles occur in the order named, the ventricle contracting only in response to stimuli received from the auricle through the auriculoventricular bundle. But, while normally the stimulus for contraction arises in the sinus part of the auricle, if any other portion of the heart becomes more excitable—as it may do in abnormal conditions—the stimulus for contraction arises at that particular point.

The stimulus for contracting is conveyed from fibre to fibre by means of a specialized function of the muscle fibres called conductivity; by conductivity is meant the power of conveying the stimulus for contraction from fibre to fibre. We can measure conductivity by means of the clinical polygraph and the electrocardiograph. All we have to do is to measure the time between the commencement of the systole of the auricles and that of the ventricles. Defects of the auriculoventricular junctional tissues give rise to varying degrees of heart block.

The great advance in our knowledge of irregular action of the heart has been almost entirely due to the introduction of the clinical polygraph and the electrocardiograph; for by means of these instruments we are able to obtain records of the movements of both the auricles and the ventricles, and also to make out the time relations of the contraction of these chambers. But what I want to emphasize is the fact that while most of our knowledge is the result of investigations which have been conducted by means of these instruments, the work of elucidation having been done, for practical purposes the use of these instruments is now not necessary in the great majority of cases of irregular action of the heart, all that is required being skilled employment of the ordinary methods of examination, particularly miscultation, and in a still larger proportion of cases—indeed, in the vast majority—the use of a Dudgeon's sphygmograph. In this connection may I commend the superior advantage of auscultation at the apex over other methods of physical examination in endeavoring to determine the rhythm of the cardiac action.

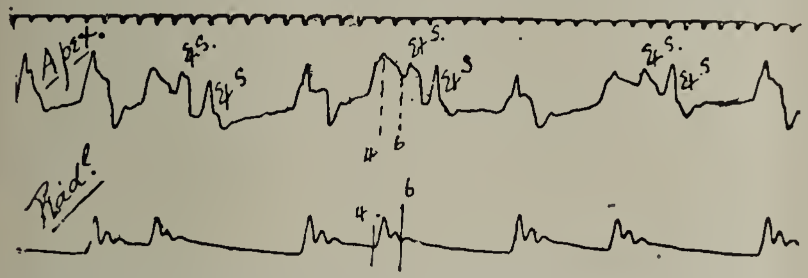

Fig. 1.—Simultaneous tracings of the apex beat and of the radial pulse, from a case with extrasystoles. The extrasystoles, eight in number, failed to send pulse waves to the wrist.

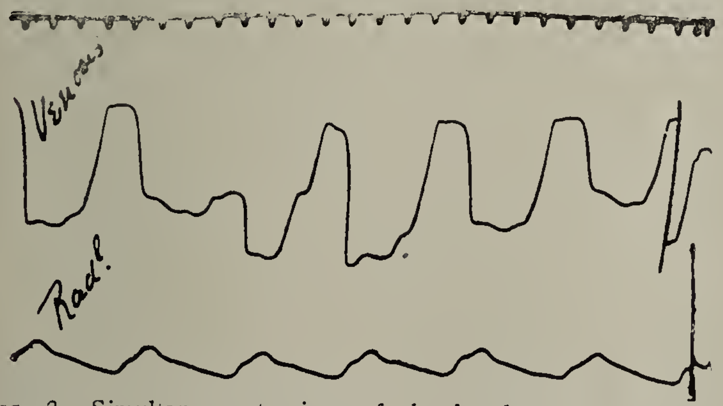

Fig. 2.—Simultaneous tracings of the jugular and radial pulses, from a case of aortic stenosis.

Sinus irregularity.—In sinus irregularity the stimulus for contraction arises at the normal site, namely, at the junction of the veins with the auricles, but the rhythm of the sinus is not regular. The condition is much more frequently met with in the young, but it may occur at all ages. There is a variation in the length of the diastolic period of the cardiac cycle, the systolic period remaining constant. On auscultation, therefore, the interval between the first and second sounds is found to be constant, while the varying length of the diastolic interval can be detected. If a tracing of the radial artery be taken, the intervals between the beats are found to vary; but the actual variations are not numerous, and the pulse beats are of equal or nearly equal size (Fig. 3). There is usually a definite relationship to respiration. The irregularity is most marked during slow respiration, and, indeed, may only be noted on deep breathing. When irregularity of the cardiac action is found to be definitely related to respiration, it is in all probability of the sinus type.

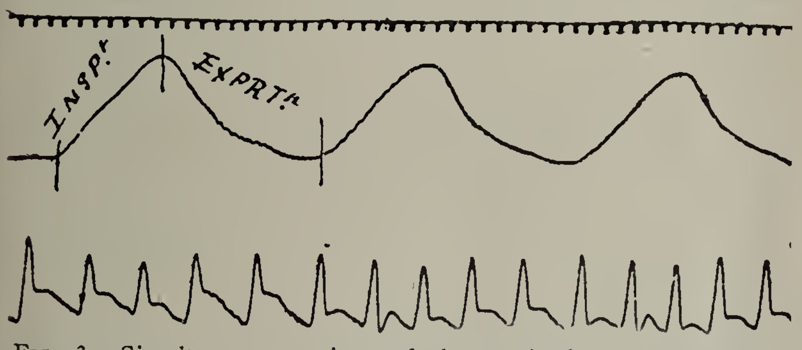

Fig. 3.—Simultaneous tracings of the respiration and the radial pulse, from a healthy boy, aged fourteen, showing sinus irregularity.

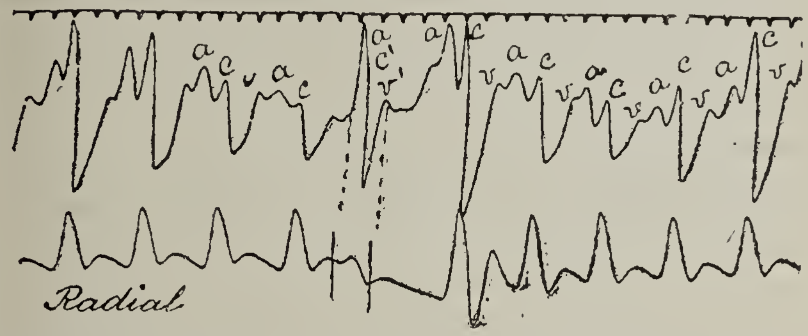

Fig. 4.—Simultaneous tracings of the jugular and radial pulses, showing an extrasystole. The extrasystole is synchronous with the systole of the auricle (ac').

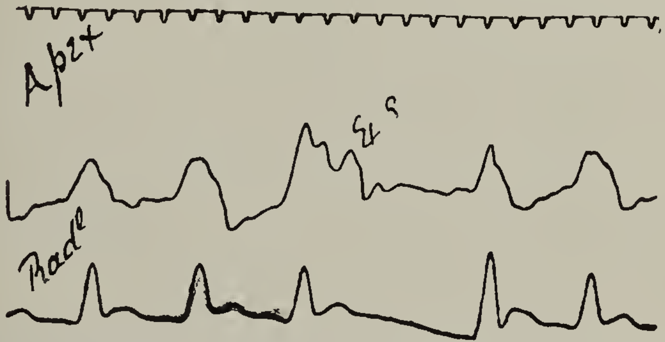

Fig. 5.—Simultaneous tracings of the apex beat and of the radial pulse, showing intermission of the pulse, due to a ventricular extrasystole failing to send a wave to the wrist.

What is the significance of sinus irregularity? There is no reason to suppose that it is either indicative of an impaired heart, or that it adds to the gravity of any diseased cardiac condition which may be present. The condition may, therefore, be totally disregarded in an examination for life insurance.

The extrasystole.—By extrasystole is meant the premature contraction of the auricle (auricular extrasystole), or of the ventricle (ventricular extrasystole), or of both chambers together (nodal extrasystole), while the fundamental or sinus rhythm is otherwise maintained in most cases (Fig. 4). Extrasystole may appear at long, or at frequent irregular intervals, or regularly after each beat, or after every second, third, or more normal beats. In most cases the pause which follows the premature contraction is abnormally long, being called the compensatory pause, and the pulse beat immediately following a compensatory pause often has a greater amplitude than on other occasions.

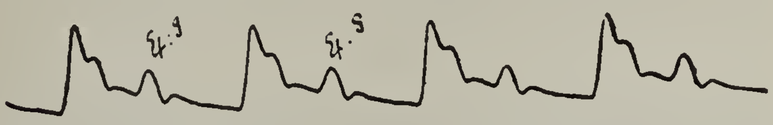

Fig. 6.—Pulses bigeminus, due to a single extrasystole with its succeeding compensatory pause occurring regularly after each normal beat.

On auscultation, in the vast majority of cases two heart sounds are synchronous with each extrasystole. Sometimes, however, the extrasystole occurs early in diastole, and before the cardiac muscle has had sufficient time to recover fully from the preceding systole, in which event the premature contraction is so feeble as to fail to open the aortic valves, and only the first sound is heard. Very rarely the premature contraction is so feeble as not to produce any cardiac sounds whatever. An extrasystole may be so feeble that no wave is felt at the wrist, so that there is simply an abnormally long pause, resulting in what is called a dropped beat or an intermittent pulse. By far the commonest cause of an intermittent pulse is an extrasystole which fails to reach the wrist (Fig. 5). If a single extrasystole with its succeeding compensatory pause occurs regularly after each normal beat, then the beats at the cardiac apex occur in pairs, as also do the pulse beats (Fig. 6), the latter condition being called pulsus bigeminus.[1] If a single extrasystole with its succeeding compensatory pause occur after every two normal beats, then the apex beat occurs in threes, as also do the pulse beats, the condition being known as *pulsus trigeminus;* but if the premature contraction is so feeble that no wave reaches the wrist, the pulsebeats are paired (pulsus bigeminus). If an extrasystole occurs regularly after each normal beat and the extrasystole fails to reach the wrist on each occasion, the rate of the arterial pulse is halved. The next most common cause of an intermittent pulse is partial heart block (Fig. 7). Pulsus bigeminus (Fig. 8), pulsus trigeminus and halving of the pulse rate may also be caused by partial heart block.

In the great majority of cases a correct diagnosis of extrasystoles can be made simply by palpation and auscultation, especially the latter. The differential diagnosis between intermission of the pulse, pulsus bigeminus, pulsus trigeminus and halving of the pulse rate, due on the one hand to extrasystoles and on the other to partial heart block, can as a rule readily be made by means of palpation and auscultation. In the former case a premature beat can be detected at the apex beat, and on auscultation one or two heart sounds will, in the vast majority of cases, be audible during the early part of the pause, because the ventricle has contracted; whereas in the case of partial heart block, there will be absence of an apex thrust and of heart sounds during the pause, because the ventricle has failed to contract.

Extrasystoles may be met with at any age, but they are much more frequent in the middleaged and elderly than in the young. Extrasystoles are of more common occurrence in men than in women, and are also more usual in the subjects of heart disease than in those who are not, and are more frequent in myocardial degeneration than in valvular disease. But it should be remembered that there is a large group of cases in which extrasystoles are present without any other manifest cardiac abnormality. They are to be found, for example, in persons with a history of rheumatic infection, the victims of tobacco poisoning, in digestive disturbances, supernormal blood pressure, neurasthenia, and as a result of the administration of certain poisons, especially digitalis and aconitine; in some cases no cause is ascertainable.

What is the prognostic significance of extrasystoles? They indicate that some portion of the heart below the sinus is more excitable than the sinus. In 1911 I wrote that when extrasystoles are considered by themselves—that is, without reference to the conditions with which they might be associated—there was so far no evidence for supposing that they were either indicative of an impaired heart or that they added to the gravity of any existing morbid condition. Further experience has not led me to change that opinion, and, therefore, for life insurances I should base my opinion entirely upon the associated conditions and take no notice of their presence alone.

Depressed conductivity—partial and complete heart block.—There are three degrees of depressed conductivity: 1. There is merely a prolongation of the interval which separates the commencement of contraction of the auricle and that of the ventricle, each stimulus of the auricle reaching the ventricle, which duly responds. 2. The stimulus does not always reach the ventricle; in other words, the ventricle does not always respond to the stimulus from the auricle. 3. No impulses reach the ventricle from the auricle, so that the auricles and ventricles beat independently of each other; the former in response to stimuli received from the sinus, and at an approximate rate of 73 a minute, and the latter as the result of stimuli arising in its own wall, at about 30 a minute, because this is the normal ventricular rate. The first two degrees are called partial heart block and the third is called complete heart block.

The first grade of heart block may give rise to irregularity of the pulse, on account of variations in the length of the intervals between the contraction of the auricles and of the ventricles. In my opinion this grade can only be recognized by means of the polygraph or the electrocardiograph. The second degree of heart block may give rise to dropped beats, pulsus bigeminus, pulsus trigeminus, and halving of the ventricular rate. The differential diagnosis from extrasystoles has already been dealt with. The higher grades of heart block give rise to infrequency of the pulse rate. When the ventricular rate suddenly falls to half its former rate, in all probability the case is one of two to one heart block. In complete heart block the pulse rate is slow, not infrequently being between 20 and 30 beats a minute, and usually not more than 36, though some cases have been recorded in which the rate has been considerably higher—even up to 60 beats a minute.

It is sometimes difficult to distinguish between partial and complete heart block without the aid of the polygraph or electrocardiograph. Most cases with a ventricular rate of 36 or under, however, are cases of complete heart block. Also the presence of more rapid pulsations in the jugular veins than the rate of the radial pulse, and the presence of small waves occurring at regular intervals on the descending limb of a sphygmogram afford help in differential diagnosis. Persistent heart block of mild degree is indicative of myocardial damage.

Pulsus alternans.—By pulsus alternans is meant a condition of the pulse in which, while the rhythm is perfectly regular, a large beat and a small beat alternate (Fig. 9). In the vast majority of cases it is necessary to take a tracing of the radial artery in order to recognize the condition. When pulsus alternans occurs in association with the normal rhythm, it is an indication of extreme exhaustion of the heart muscle; when the condition lasts for only a few cycles, this exhaustion may be only temporary, but even in these cases the prognosis should be guarded; when it is continuous, death may follow within a few months, or at most in a few years. When the condition is associated with an abnormal rhythm, such as auricular flutter, it does not appear to have any serious significance in itself.

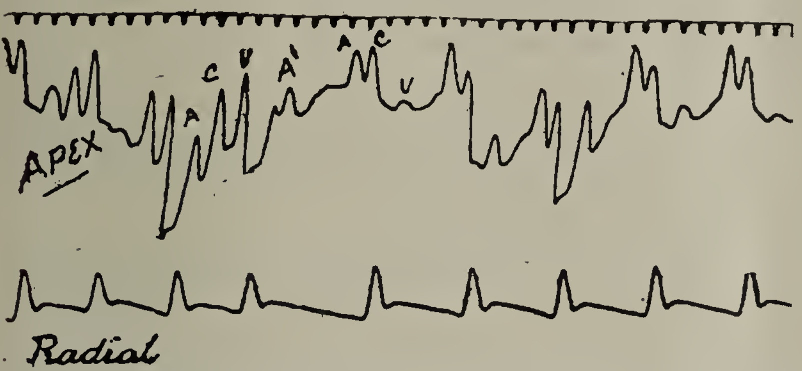

Fig. 7.—Simultaneous tracings of the apex beat and of the radial artery, showing the intermission of the pulse, due to partial heart block, the ventricle failing to respond to the stimulus of the auricle at A′.

Auricular fibrillation.—It is of the utmost practical importance with regard to life insurance that auricular fibrillation should be recognized. It accounts for approximately fifty per cent. of all cases of persistent irregularity of the heart. When auricular fibrillation has once set in, it persists for the remainder of life in the great majority of cases. It results in an irregular, and, in most cases, a much too frequent pulse. Such a change in the action of the ventricle, as a rule, produces a considerable effect on the heart's efficiency, and when the ventricular rate is much above the normal, symptoms are usually present and these are the same as those of cardiac failure from other causes. There is a wide variation in the ventricular rate, this ranging from 40 to 140 or even 180 a minute, the average rate being between 90 and 140. The ventricular rate should in every case be counted at the apex, either by palpation or auscultation, preferably the latter, as the rate of the radial pulse does not necessarily represent the ventricular rate, for many beats of the heart may not be transmitted to the wrist, especially when the ventricle is beating rapidly. As already stated, the pulse is irregular, and the irregularity represents the following features, which are of profound importance for diagnosis:

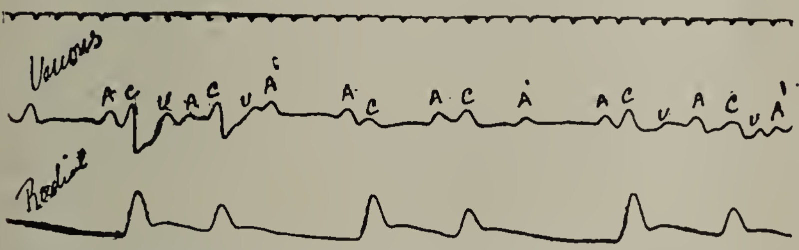

Fig. 8.—Pulses bigeminus, due to partial heart block, the ventricle failing to respond to the stimulus from the auricle at A′.

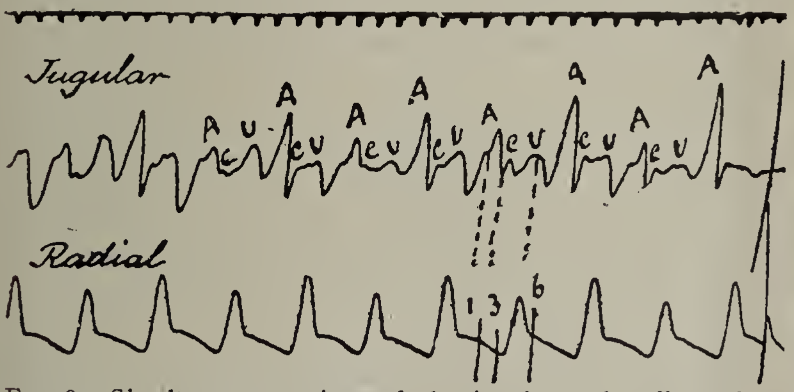

Fig. 9.—Simultaneous tracings of the jugular and radial pulses, showing continuous pulsus alternans.

1. It is always continuous, and in the great majority of cases it persists for the rest of the patient's life, in this respect differing from most other types of irregularity. 2. A feature of even greater importance is the fact that the irregularity is complete; it is an irregularly irregular pulse (Fig. 10). Two pulse beats of the same length or size rarely follow each other. There is often no relation between the length of a pause and the strength of the beat which follows it, i. e., a short pause may be followed by a strong beat, and a long pause by a weak beat. The beats may be coupled[2] for long or short periods, and this may occur independently of the action of digitalis, although it is usually due to it. This type of irregularity can usually be differentiated from the other types by palpation of the radial pulse and of the apex beat, and still better by auscultation at the apex. When the ventricular rate is slow, or very rapid, it may be necessary to take a sphygmogram and to adopt careful measurements.

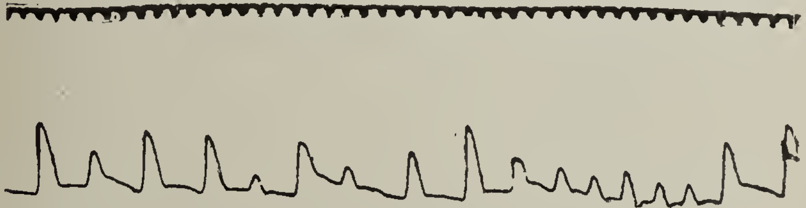

Fig. 10.—Tracing of the radial pulse, from a case of auricular fibrillation, showing complete irregularity of the pulse.

A diagnosis of auricular fibrillation may be made by means of the clinical polygraph or by the electrocardiograph. What I wish to emphasize is that we may be reasonably certain of its existence from the mere presence of complete irregularity of the pulse.

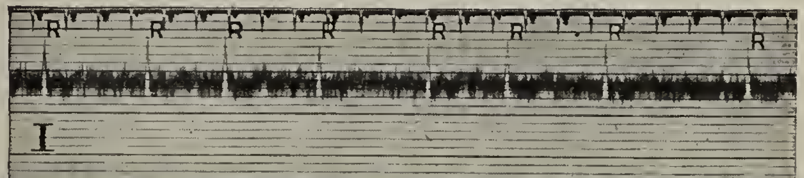

Fig. 11.—Electrocardiogram from a case of auricular flutter. The auriculoventricular rate is sometimes 2:1, at others 3:1, and at others again 4:1. The response of the ventricle to auricular contraction being at irregular intervals, there is irregularity of the ventricular rhythm.

Auricular flutter.—In most cases of auricular flutter there is a constant and uniform ratio between the auricular and ventricular rate, so that the rhythm of the arterial pulse is regular. When, however, as is not infrequently the case, the response of the ventricle to auricular contractions is at irregular intervals, there is irregularity of the pulse rhythm (Fig. 11) it may be even markedly so. In some of these cases the sphygmogram may resemble that in a case of auricular fibrillation; but if a sphygmogram in a case of auricular flutter be carefully studied it will be found that even though the ventricular rhythm is markedly irregular, the pulse beats measure out into groups of equal length, whereas this is never the case in auricular fibrillation. We should consider the possibility of auricular flutter whenever an individual is conscious of a marked increase in the cardiac rate or complains of attacks of palpitation, occurring suddenly and without apparent cause, or suffers from dyspnea on exertion and other indications of cardiac failure coming on rapidly, especially if the rhythm of the pulse is regular. In some cases a correct diagnosis cannot be made with certainty even though the polygraph is employed, an electrocardiographic examination being necessary.

Condition of the vessel wall and the arterial blood pressure.—Lack of space prevents me from dealing with these, except to touch upon a few points. I would first remind you of the importance of examining the walls of the brachial and temporal arteries, as well as that of the radial. Recent investigations have thrown a flood of light upon the pathology of diseases of the vessel wall. This was much needed, as the term arteriosclerosis, which means arterial hardening, has hitherto been applied to at least four different pathological conditions of the vessel wall, namely, 1, chronic inflammation of arteries; 2, degeneration of the intima; 3, degeneration of the middle coat, including Monckeberg's degeneration; and 4, muscular hypertrophy.

In my opinion the term arteriosclerosis should now be discarded. I would refer you to a valuable paper by Dr. Herbert M. Turnbull, in the *Quarterly Journal of Medicine* for April, 1915, and Dr. Theodore Thompson has written a clear account of diseases of the arteries, in view of recent discoveries in their pathology, for a textbook of medicine which I am editing. He classifies diseases of the arteries as follows: 1. Arterial inflammation or arteritis: a, acute; b, chronic. 2. Arterial degeneration: a, of the intima, or atheroma; and b, of the media—1, Monckeberg's degeneration, and 2, fatty degeneration. 3. Arterial hypertrophy. 4. Arterial infiltration, of which the best known variety is amyloid degeneration.

Chronic arteritis is in the vast majority of cases caused by syphilis. The condition primarily affects the arterioles. The aorta and other large elastic arteries are affected secondarily, through the vasa vasorum and their terminations in the external and middle coats. The thickening and thrombosis of the vasa vasorum result in necrosis in the inflamed areas of the media, with consequent weakening of the vessel wall, which may result in circumscribed saccular aneurysm. The large muscular arteries, such as the radials, are only rarely affected by syphilis, so that the latter are almost always not thickened. In chronic arteritis high blood pressure is not common.

With regard to atheroma, syphilis is not a cause. The disease affects the large elastic and muscular arteries. It is usually most marked in the aorta, and as the atheroma may be associated with a similar degeneration of the elastic media a fusiform aneurysm or dilated aorta may result. On the other hand, atheroma does not cause saccular aneurysm. The blood pressure is either normal or only moderately raised. The radial and temporal arteries are frequently affected, becoming irregularly thickened and tortuous, and visible pulsation of these vessels is sometimes to be observed.

In Monckeberg's degeneration the vessels of the lower limbs below the bifurcation of the femoral are most commonly affected and the radial only occasionally. The vessel wall feels like a pipestem, and sometimes crackles when rolled beneath the finger.

Arterial hypertrophy is not caused by syphilis. The muscular arteries, and therefore the radial, are those chiefly affected, the aorta being rarely involved. The vessel wall is felt to be uniformly thickened—the socalled whipcord artery, and this is most evident when the vessel is most contracted. There is usually a considerable rise in the arterial pressure; the systolic reading may reach even 250 mm. or more.

INSPECTION, PALPATION, PERCUSSION AND AUSCULTATION.

May I remind you of a few facts with respect to inspection, palpation, percussion and auscultation. We should be on the lookout for extrinsic causes of displacement of the apex beat and of an increase in its extent. It is also important to remember that the force of the apex beat may be increased by other causes than cardiac hypertrophy, as, for example, in cases in which the chest wall is thin, in retraction of the left lung, when the cardiac action is excited—as during and immediately following muscular exertion or mental excitement, and in irritable heart. In cardiac hypertrophy, the apex beat has a heaving or thrusting character, that is, it is slower and longer than normal, and this sign is the most characteristic feature of hypertrophy. Among other causes of cardiac hypertrophy is an excessive amount of muscular effort, as in athletes and in laborers, in which case it seems clearly established that the hypertrophy may disappear when the cause no longer exists, unless long continued, when it is prone to be followed by dilatation. Diminution or disappearance of the apex beat is, of course, not necessarily indicative of cardiac disease.

In mitral stenosis the apex beat is sometimes in the form of a peculiar sudden tap communicated to the fingers, which is very characteristic. Indrawing of the apex beat, and systolic recession in the intercostal spaces on either side of the sternum, or in the epigastrium, or even of the lateral or posterior walls of the left side of the chest, does not necessarily indicate the existence of chronic adhesive pericarditis. A positive diagnosis of this disease should not be made from the presence of one sign only, except when diastolic rebound or shock exists, after the systolic retraction, and perhaps also in those cases in which systolic recession of the sternum itself exists.

(*To be Concluded*).

Mitral Stenosis*

By SIR JAMES BARR, C.B.E., D.L., M.D., LL.D., F.R.C.P., F.R.S.E.,
London,
Knight of Grace of the Order of the Hospital of St. John of Jerusalem in England.

(*Concluded from Page* 525).

The necessity for this theory seems to have arisen in the minds of certain individuals from the fact that the heart of the tortoise, frog, and other animals, go on beating in a rhythmical manner when removed from the body, and quite free from blood, but I fail to see what that has to do with the more highly specialized function of the mammalian heart. The heart of the tortoise possesses the function of rhythmic contraction in a high degree, and all muscular tissue possesses it to some extent; a clonus can frequently be established in the voluntary muscle. In a venous tracing, which I show, there is a regular series of rhythmic waves during the diastolic periods which might be readily mistaken for auricular beats, but which are really due to the involuntary rhythmic impulses of the hand of the individual who was holding the receiver on the vein; in trying to keep the pressure equal on the vein a regular rhythmic contraction was set up in the hand, and this was overcome by the systole and again reappeared during diastole. Voluntary muscle fibre starts rhythmic contraction under a pressure of six or seven atmospheres, the knee jerk occurs too rapidly to be a reflex, but if you divide the anterior crural nerve, you abolish the knee jerk because you cut off the nervous impulse which maintains the tone of the muscle and tendon, so with the sinor auricular node and the bundle of His, they maintain the tone and nutritive function of the cardiac muscles.

I have often abolished my own pulse and momentarily stopped my heart by tension on my vagi nerves.

I have seen some of Sherrington's experiments on the isolated mamalian heart which he kept beating for hours under the influence of nutritive fluid supplied under a certain pressure through the aorta and coronary arteries. The heart contracted quite rhythmically, and after several systoles there regularly occurred an extra powerful systole of the right ventricle to dispose of the accumulated fluid which had been returned by the cardiac veins to the right auricle, and thus raised the diastolic tension in the right ventricle. If he had depended on any imaginary contraction stimulus to be generated and propagated, rather than on the pressure in the coronary arteries, the heart would have quickly come to a standstill. The living cardiac muscle is irritable and contractile, and can be made to contract by any stimulus; mechanical, chemical, or electrical, but the mammalian heart will only continue to beat rhythmically under the stimulus of a certain diastolic tension in its cavities and in the coronary vessels. The right side of the heart is more excitable than the left and responds to a lower pressure.

CHARACTER OF FIRST SOUND IN MITRAL STENOSIS.

The first sound is unusually loud, clear, sharp, abrupt, and banging or thumping. It may be described as a thud, resembling the accentuated pulmonic second sound, only nearly twice its length. Certain writers, thinking that the mitral valve is not in a condition to generate sound, concluded that this more or less characteristic sound is produced by the tricuspid valve. It would have been well if they had made certain of their premises before arriving at such a hasty generalization. The valve segments are usually in a good condition for generating sound. From the insertion of the chordæ tendineæ over the greater part of the cusps often the whole valve is readily rendered taut with the exception of the thickened and rigid orifice which may permit of free regurgitation. In many cases the valve is so puckered and contracted as merely to form a transverse septum, and in such cases the booming first sound is wanting. When the first sound is duplicated, the first clear, short and sharp element of tricuspid origin is very different from the loud booming first sound heard during the quick action of the same heart. The character of the murmur also affords valuable evidence as to the nature of the segments and the orifice. When the orifice is rough and thick, and the auricular contraction vigorous, you may get a rough purring presystolic thrill at the apex.

THE PULSE.

The pulse is variable. When the compensation of the right ventricle is well maintained, then the pulse is infrequent, slow, small and firm, and fairly regular. When the mitral orifice is much contracted it becomes small, infrequent, weak and irregular, both in force and rhythm, with numerous interpolated systoles. When the right ventricle is much dilated, failing in power and free regurgitation through the tricuspid orifice, then the pulse becomes frequent, quick, small, weak and very irregular in force and rhythm. Interpolated pulsations in the downstroke of the sphygmogram are present in all cases of marked stenosis.

These pulsations represent systoles and never occur before the aortic notch in the primary or subsequent pulsations. The left ventricle contracts on a small quantity of blood which may be barely sufficient to raise the aortic valve, thus producing a very abortive pulsation in the down stroke, or it may be enough to raise the lever of the sphygmograph to its normal height and maintain the ordinary pressure in the arteries. You may have even five or six of these pulsations recorded in the sphygmogram before the lever reaches the base line. At other times the beats may be perfectly uniform and regular for a long period.

CONDITION OF THE LUNGS.

As a result of the chronic overloading, with heightened pressure in the pulmonary circuit, we get increased cell proliferation and diapedesis of the blood corpuscles, giving rise to the condition termed brown induration. In some severe cases the lung tissue becomes quite tough and leathery.

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*Delivered before the Birkenhead Medical Society, February 9, 1923.

There is also usually bronchial catarrh, and not infrequently hemoptysis. These lung changes give rise eventually to complementary emphysema. The lung symptoms frequently become so prominent as to obtrude themselves on the attention, and obscure the underlying and primary mitral affection.

CONGESTION AND COLLAPSE OF PULMONIC LOBULES.

In the majority of cases of mitral stenosis, if you carefully percuss the back of the chest, especially after the patient has been for some time in the dorsal decubitus, you will find small, circular, and oval areas from about the size of a shilling to that of a crown piece, of comparative dulness. Over these areas the vesicular murmur is defective, the breath sounds rather harsh and slightly tubular, and frequently inspiration is accompanied by a few crepitant râles, and the heart sounds are often clearly conveyed. These little areas of dulness arise from congestion in the pulmonic vessels, some of the aerating space is not required and the air cells are encroached on by the overloaded intrapulmonary vascular cavity. The dullness is never absolute, and the areas are apt to vary from day to day, some clearing up, and others becoming established; they clear up when the patient is moving about, taking deep inspirations, and when friction has been applied to the back. This sign I discovered over forty years ago, and it is one to which I attach considerable importance. The percussion note is only relatively dull, and it is best elicited by delicate percussion; there should be no interference with the vibration of the chest walls.

THE LIVER AND SPLEEN.

The liver is passively congested, especially when there is failure of the right ventricle, and the whole venous system is engorged. The hepatic dulness may extend below the level of the umbilicus, but the spleen is not usually much enlarged. You get the large nutmeg liver.

THE VEINS OF THE NECK.

There is frequently visible pulsation in the veins of the neck, especially when the patient is recumbent; and this may be either auricular or ventricular in rhythm, or both. In tricuspid stenosis the tension in the veins of the neck is much higher than in mitral stenosis alone. In tricuspid stenosis the veins of the heart are much dilated, and those in the substance of the ventricles become like large sinuses.

DROPSY.

Dropsy does not occur until there is failure of the right ventricle, and, unlike that in mitral regurgitation, it frequently begins as an ascites. When it starts in the lower extremities it is due to failure in the left ventricle with fall in the arterial blood pressure rather than to any venous engorgement. Patients suffering from tricuspid stenosis are particularly liable to hydrothrax when dropsy sets in, owing to the obstruction to the vena azygos.

THE SIZE OF THE ORIFICE.

I am in the habit of weighing all the factors in each case, and then mentally estimating the size of the orifice. Usually at the autopsy my estimates are pretty near the mark. The estimated measurements which I generally employ are the size of a lead pencil, the tip of my little finger, my little ring, middle or forefinger, my thumb, or two fingers.

THROMBOSIS AND EMBOLISM.

Thrombi are not infrequently formed in the left auricle, and are readily carried to the brain, spleen, or kidneys. The left middle cerebral artery is a common site of a plug, and then we get aphasia and right hemiplegia. The usually soft and unorganized nature of the embolus renders treatment successful. All lime salts should be removed from the diet, decalcifying agents and strong ammonia freely used.

THE LIME SALTS.

The calcium ions are usually in excess in the blood and in the muscular tissue, largely owing to milk forming a stable article of diet. It is unfortunate that the ideas of a large number of medical men as to suitable diets for invalids should be restricted to milk and the numerous abominable milk foods found on the market.

In fact, some men's ideas are so fixed that you might almost think they were set in plaster of Paris. For the brains of such I would like to prescribe a long course of decalcification. The calcium ions, in my opinion, largely contribute to the evolution of mitral stenosis; they raise the blood pressure by increasing the tone and contraction of the smaller arteries, and by augmenting the viscosity of the blood. At one time I thought the heightened arterial blood pressure was due to arteriolar contraction, but I am now quite willing to give a fair share of the increase to the viscosity of the blood, as I find that the arterial blood pressure can be rapidly and permanently lowered by the free use of decalcifying agents. As the left ventricle has more work to do and has more muscular tissue than the right, it gets a larger supply of lime; its muscular tissue and the musculi papillares get hypertrophied. The violent collision of the mitral cusps leads to cell proliferation, and the large supply of calcium ions contributes in no small measure to the formation of fibrous tissue, and the cementing together of the edges of the valve. When patches of atheroma have taken place anywhere, the abundance of lime salts are readily deposited in the form of calcium soaps.

The calcium ions increase the force of the muscular contraction but diminish muscular irritability; hence the left ventricle often becomes much less responsive than the right, and in this way the calcium ions contribute to the production of the peculiar cardiac rhythm which I have before described. The conclusion of Loeb as to the effect of various ions in muscular contraction are given by Wenckbach as follows:

"1. There are certain ions—for example, sodium chloride, lithium, barium, iodine, and others—which (in solution under a pressure of 4.01 atmospheres) are capable of producing rhythmical contractions in muscles. These ions do not produce such contractions by increasing excitability, because, 1, the contractions continue when the excitability is diminished; and, 2, they do not take place in solutions of nonconductors (for example, glycerine, sugar) at the same osmotic pressure, even when the excitability is normal. It is more natural to think that these contractions are due to definite chemical combinations which these ions form in the muscle.

"2. There are ions which inhibit the rhythmical contraction of normal muscle fibres—for example, calcium, potassium, bismuth, barium. The inhibitory action of calcium, potassium, and probably of all the other ions mentioned here, does not depend on a reduction of the excitability. For on adding a little calcium chloride to some physiological salt solution the contractions are inhibited, while the excitability of the muscle is less impaired and lasts longer than it does in physiological salt solution, when the rhythmical contractions occur. It is more natural to think that the chemical combination which the ions calcium and potassium form in the muscle renders its rhythmical contractions more difficult or impossible.

"3. Hydroxyl or hydrogen ions accelerate the production of rhythmical contractions when they are added in sufficient dilution to solutions of the ions that excite contractions, as enumerated in I. But when they are put into solutions of nonconductors or inhibitory ions they do not have the same effect. They have, therefore, a catalytic action in the production of rhythmical contractions, but are unable of themselves to produce them.

"4. From the very scanty material that is yet available it seems that only ions, and not nonconductors, have the power of setting up rhythmical contractions in voluntary muscle.

"5. The laws regulating the periodical action of the ventricle appear to be similar to those that have been given here for striated muscle.

"6. In all experiments that have been described here it is the muscle substance itself that sets up this rhythmical action, since periodic contractions cannot be started from either the nerves or spinal cord through the solutions mentioned in I."

The human heart requires much less pressure than that stated by Loeb for involuntary muscle to maintain its rhythmic contraction. The ordinary atmospheric pressure or less is sufficient for the right auricle, a little more than an atmosphere for the right ventricle, perhaps a little more still for the left auricle, and often considerably more for the left ventricle. Large hypertrophied and degenerate hearts require high diastolic pressure to maintain their rhythmic contraction; hence in such cases it is not wise to attempt to reduce the arterial blood pressure very low, because if syncope does occur it is difficult to get sufficient pressure up to start the heart again. The actions of calcium and of potassium, stated by Loeb to be inhibitory agents, are scarcely comparable, as the former increases the force of the muscular contraction and delays dilatation, while the latter has a paralyzing effect on contraction, but hastens dilatation. Sydney Ringer long ago showed that the salts of calcium and potassium were antagonistic both in physiological and toxic doses, but in this antagonism their actions were complementary in maintaining the rhythmic contractions of the heart. The high tension in the auricles often sets up auricular fibrillation, or flutter and in such cases agents which lessen the irritability of the cardiac muscle, such as calcium and digitalis, should be freely used.

PREVENTION AND TREATMENT.

As mitral stenosis is usually a sequela of acute rheumatism it is with the prevention of that disease that we should begin. Children with any hereditary tendency to rheumatism should be protected against the vicissitudes of climate and should be encouraged to live a healthy, active life. Those subject to adenoids and large tonsils are specially liable to this disease; these affections are due to defective action of the thyroid gland which in turn is associated with a deficient supply of iodine and an excessive supply of lime. Milk is an excellent diet for infants, but when they have got their teeth a more varied diet should be substituted. Adenoids and enlarged tonsils are easily prevented by giving children small doses of iodine and if necessary also thyroid. The thyroid gland is the natural storehouse for iodine and this should not be replaced by calcium. When the thyroid is properly functioning an immunity is established against these diseases. When rheumatism has not been prevented then it should be treated in the usual way with salicylates and alkalies, but in dealing with it and any subsequent heart affection, diet and hygienic measures are of great importance.

DIET.

In rheumatic fever there is a marked increase in the formation of sarcolactic acid, and all the excretions are acid; I therefore think it advisable to omit all foods, such as starch and milk which give rise to the formation of lactic acid in the digestive tract. There is also a great tendency to the formation of fibrin, hence everything containing lime, such as milk, and all preparations of milk, cheese, gelatine, and animal jellies should be strictly interdicted. Lime also raises the blood pressure and so increases the strain on the valves. I know that I am here running counter to the general advice of the profession, as with most medical men milk is their sheet anchor in their diet for this disease, but I condemned it in 1886 and I have consistently done so ever since. A great many medical men are like the Yankee who did not know anything about measles but was death upon fits, so they make no attempt to prevent the rheumatism, or endocarditis and pericarditis, but when the latter occur they are all alert and quite prepared to give you a learned disquisition on the treatment of these two complications.

One of the recent evolutions in the treatment of pericarditis is to wait till there are some recent adhesions and then start with injections of fibrolysin—without any convincing proof that it is able to resolve even recent scar tissue. This would be really amusing if it were not serious. Personally I prefer to prevent the adhesions by cutting the lime salts out of the diet and making free use of decalcifying agents. Milk should not only be interdicted in acute rheumatism, but also in the subsequent treatment of the heart lesions. An excellent diet for rheumatic fever consists of plenty of hot water, minced meat and poached egg, pounded chicken, steamed sole and other nitrogenous articles of diet. If any carbohydrate be required, well boiled porridge may be given, the silicates in the oatmeal have a decalcifying effect. I am also very fond of syrup of glucose which is palatable when administered with infusion of orange. This, unlike cane, and milk sugar, does not readily undergo lactic acid fermentation. Oranges and lemons may be freely used. When the rheumatic attack is over the diet may be more varied, there may be allowed a fair amount of farinaceous food, and plenty of fruit and vegetables, but milk should still be eliminated.

There are two classes of patients in whom you will find mitral stenosis, the fat, flabby, lethargic, and somewhat phlegmatic individual, who likes her food and does not care for much exercise, and on the other hand the spare, active, rather neurotic individual who does not overindulge in the good things of this life; this latter class wears much better, and this knowledge should help you in directing your diet, which should be light and nutritious with a fair allowance of meat, fruit, and vegetables, and not much starchy food. The food should be merely sufficient in quality and quantity to maintain healthy nutrition, if the patient is laying on fat the food is too abundant. I am in the habit of advising these patients to drink as little fluid as possible, never more than two pints a day, and if the tissues be at all flabby, or there be any venous turgescence, I frequently reduce them to half this amount. All fluids drunk have to pass through the right side of the heart before they are excreted (except what is carried off by purgation), and any excessive amount only handicaps it without producing any benefit. I know that some physicians like to drench their patients with the view of washing away effete products, but it is a much wiser plan to keep the patient on a light, dry diet, and not produce more effete products than can be excreted without flushing. The regular use of all alcoholic drinks should be strictly interdicted. Tea and coffee with cream may be left to the discretion of the patient, except so far as quantity of fluid is concerned. Tobacco should be forbidden. If there be any tendency to edema the salt should be cut down.

HYGIENIC.

During the endocarditis there should be prolonged rest in bed, and the blood pressure kept as low as possible. When mitral stenosis is more or less established a moderate amount of exercise is highly beneficial. The mode of life should be prophylactic against a development of attacks of rheumatism. The patient should be warmly clothed with flannel next the skin, and he should avoid all vicissitudes of climate. When at any time the feet are damp or the body wet and chilled, the clothing should be changed and the surface circulation reestablished as quickly as possible. The action of the skin should be maintained, and for this purpose daily ablutions are necessary. A morning bath at a temperature from 60° to 90° F., according to the susceptibility of the patient, with coarse friction afterwards, will be found very advantageous. The combustion within the system should be as thorough as possible, and with this end in view the patient should avoid all close, heated atmospheres, and live as much as possible in the open air. A warm dry climate is the best. He should not live at too great an elevation from the sea level so as to obviate the effects of a rarefied atmosphere, which leads to pulmonary congestion, and further tasks the already overworked right ventricle. The life should be at a low level, not merely so far as the earth's surface is concerned, but in every other respect, and free from all mental worry and care. The patient should be enjoined to pursue the even tenor of his way in a happy and contented frame of mind, and simple pleasureable emotions should not be forbidden. Marriage cannot be recommended, and a timely counsel against maternity is advisable.

Short of actual fatigue, a fair amount of exercise, even to the extent of hill climbing, will prove highly beneficial, by favoring the circulation, increasing the combustion, and improving the general nutrition. The skeletal muscles contain about a fourth of the whole blood of the body; and exercise greatly increases the circulation through them and so increases the capillary area. On the other hand, if they are not used they require little nutrition, comparatively little blood passes through them, as it tends to flow in the direction of least resistance, thus the capillary area is diminished, and the general arterial tension raised. When, however, any indication of failure of compensation in the right side of the heart occurs, there must be no fashionable treatment by graduated exercise on a mountain side, but the excellent old-fashioned restorative of rest in bed must be at once adopted. If the disease be in an early stage, a few days' rest, a dry diet, and a cholagogue cathartic may be all that are required to restore the *statu quo ante.* If a long stay in bed be deemed advisable, massage should be substituted for muscular exercise.

MEDICINAL.

In the early stages of mitral stenosis the cardiac balance is usually well maintained, and drugs are unnecessary except to regulate the blood pressure for which purpose at this stage decalcifying agents, and moderate catharsis with small doses of calomel, colocynth or salines answer best. When the heart's action is labored and the pulse rather frequent I am very fond of small doses of pilocarpine on account of its stimulating effect on the vagi nerves. I frequently combine it with phosphoric acid and small doses of strychnine or the compound syrup of the hypophosphites. If the thyroid gland be inactive then small doses of iodine and thyroid will prove beneficial. You must not carry your decalcifying process too far as free calcium ions are necessary for muscular contraction and for life. In a later stage the constant high intrapulmonic tension leads to degeneration of the pulmonary vessels, and you not infrequently get a free hemoptysis, which in this case is the best form of blood letting and should not be too quickly checked. In 1886 I condemned the use of all astringents in such cases and strongly advocated the employment of nitroglycerine and atropine. When you wish to clear out any stagnant blood in the air cells turpentine is the best remedy.

If there be any thrombosis or embolism decalcifying agents, such as phosphoric and citric acids, their soluble salts should be freely used. In cases of cardiac thrombosis and pulmonic embolism where the symptoms are very urgent, strong ammonia should be freely used. A mixture of three minims each of liquor ammonia fort, and spiritus chloroformi in a wineglassful of barley water every hour, is an effective remedy.

The chronic engorgement of the lungs leads to bronchial secretion, and brown induration of the lungs with more or less destruction of lung tissue and complementary empsysema. These conditions are best obviated and relieved by a light, dry diet, a dry climate, moderate hill climbing, and little fluids. Also by laxatives, strychnine, nitroglycerine and atropine which are about the best general remedies in mitral stenosis. Cardiac tonics such as digitalis, strophanthus, squills, caffeine, and others, should only be used when there is cardiac failure, and their use should be discontinued when they have served their purpose.

Actinomycosis of the Lungs Simulating Tuberculosis

By HERMAN BESSER, M.D.,
New York,
Chief of Staff, X Ray Department, Jewish Memorial Hospital; Attending Röntgenologist, Lloyd's Hospital.

The clinical and physical signs of pulmonary actinomycosis cannot be differentiated from tuberculosis. The disease begins with a gradual onset. A cough develops, accompanied by expectoration of a yellowish, white sputum. There is an afternoon rise of temperature and night sweats soon follow. There is progressive loss of weight, accompanied by malaise and debility.

Pulmonary actinomycosis differs from tuberculosis in its morbid anatomy in that the disease spreads by continuity. In the early period of infection the disease manifests itself in the formation of small miliary tubercles which later coalesce and form large masses. They take on the appearance of a malignant growth of the lungs, and unlike tuberculosis, ignore anatomical boundaries. The infection spreads to the pleural sacs, causing an adhesion between both sacs and finally rupturing through the intercostal spaces and involving the rib structure. Necrosis of the rib develops and resembles a caries of the bone.

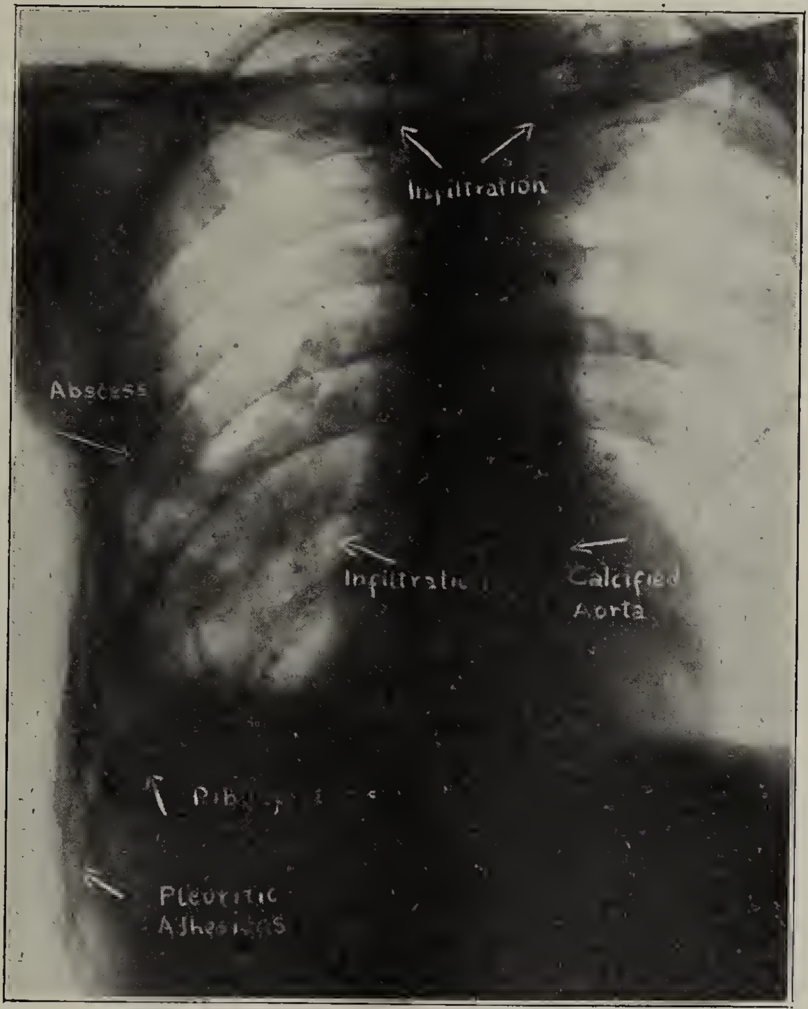

Fig. 1.—X ray photograph showing involvement of the lungs and suppurative process of the ribs in Case I.

The following case was referred to me for x ray diagnosis of presumptive tuberculosis of the lungs.

Case I.—The patient, Mr. A., aged forty-five years, first noticed his symptoms eight months previously. He complained of cough and pains on the right side, accompanied by progressive loss of weight and general weakness. His appetite was poor. The condition becoming worse, he was sent to the hospital with the presumptive diagnosis of tuberculosis and remained in bed for a month. Physical examination revealed marked dullness of the middle lobe of the right lung, extending towards the base. Breath sounds were harsh and numerous râles, both fine and gross, were heard over the dull area. Sputum examination made on three separate occasions showed the absence of tubercle bacilli. The Wassermann test was negative.

The patient was extremely emaciated, the skin had a sallow appearance, and there were numerous furuncles scattered over the chest. Respirations were increased and shallow.

Fluoroscopic examination revealed the following: The right lung showed decreased illumination of the middle and lower lobes. The apices failed to illuminate on deep inspiration. The upper right intercostal spaces showed extreme narrowing. The left chest showed compensatory emphysema. The right costophrenic and cardiophrenic sulci were obliterated. There was no fluid in either chest. The heart was of the pendulum type and not enlarged.

A radiographic examination made in the vertical position at two meters' distance, disclosed well marked parenchymatous infiltration of the lower and upper part of the middle lobe on the right side. There was also infiltration of the right apex. The left lung showed a small infiltrated area near the hilus. The aorta showed evidence of calcareous degeneration. On the right side above the nipple line, there was an oval radiolucent shadow. This shadow indicated an abscess about the size of a half dollar. The ninth and tenth ribs near their angles showed evidence of necrosis. The diagnosis was active actinomycosis. Clinical and physical findings pointed to a frank, active tuberculosis, but the marked involvement of the lungs and the suppurative process of the ribs, as shown by the x ray, pointed to actinomycosis. This diagnosis was substantiated later by the appearance of abscesses on the chest and back.

In examining chests with pulmonary symptoms the possibility of active actinomycosis should be taken into consideration, for this disease is not as uncommon as formerly believed. No doubt failure of recognition of this disease, which is almost invariably fatal and which passes for tuberculosis, accounts for the meagre report of cases in this country. Actinomycosis is common in Europe. The infection is believed to be acquired by those handling straw and vegetable products, as the disease is widespread among cattle and domestic animals.

The case here reported is the second within six months that has been referred to me for x ray diagnosis for presumptive tuberculosis in which the ray fungus was the offending organism.

50 West Fifty-Fifth Street.

A Message to the Laity*

By J. W. KENNEDY, M.D., F.A.C.S.,

Philadelphia.

It is inconsistent with good religion to know that a profession engaged in the lifesaving service should have its privileges so intercepted by a legislative enactment that mortality in many of the death dealing conditions is doubled and trebled. I cannot imagine that a wise Creator brought us into this world and then intended we should have our rights to expand denied us, and especially must this be true of a lifesaving service.

The time has come when we as a profession must no longer tell our troubles to each other, but we must reach the great legislative bodies of our country. It is they who are utterly ignorant of our rights, privileges, wisdom and the magnificent power of our profession.

I cannot conceive of so deliberate a wrongdoing of the great legislative minds of our country who by passing laws which are obstructive to our progress, deliberately take life. They will not assume this responsibility and possibly we alone know their guilt. It is therefore our duty to take in council the constructive, influential and intelligent nonmedical men of our country and tell them our troubles; tell them the death rate of our privileged profession and what it really is today as a result of permitting irregular men to practise.

We must give these gentlemen something tangible to figure from; many of them deal in abstract facts. It does not mean enough to them to hear that our regular profession is an advanced one and that the many irregular pathies which have come forth in recent years are robbing us of our legitimate privileges. A statement like this is dismissed as a mere difference of opinion, as one expressed by our profession who would naturally favor our own. It does not have a serious ring. We must give the authorities who are controlling the legislative destinies of our country facts, clear cut, unmistakable facts, facts which have been founded upon the greatest of all tragedies, death. It is my opinion we of our profession will be forced to bring this question of responsibility for death intimately into their lives; and right at this place I want to say in confirmation of this statement, I have signed many death certificates which should have been signed by the legislators who permitted the irregular to place his sign in the neighborhood of the unfortunate and misguided patients.

Admitting that the laity are ignorant of the real differences in ability of regular and irregular professions (and they are entitled to this courteous distinction), how can we prove our rights to supremacy? This is exactly what the near future must bring about. As our profession stands today, humble yet supreme, from a legislative viewpoint there can be no abuse in all American law so reprehensible as that which permits two or more standards of medical education. We must get these facts to the President of the United States, to Congress and to all of our legislative bodies.

I cannot conceive of more supreme ignorance than that which is made manifest by the enactment of certain legislative requirements necessitating the highest possible educational qualities for our profession and then permitting men of practically no preliminary or scientific preparation to practice the art of healing, as our competitors.

Privileged results must be contrasted by definite figures with those which exist as practised by a crippled profession. The causes of the crippled profession must be defined as to individual responsibility and after all individual responsibility for good or bad is that definite something we must know. Throughout my professional life I have seen the great virtue and strength of individual responsibility. It is an awful burden to carry, often a tragedy, but without it the physician is a weak, soulless and dangerous man. I cannot help but feel that we must demand that our profession be put upon trial, we must demand investigation. The relative merits of our profession must be pitted against those of all irregular pathies, since these pathies have been recognized by legislative enactment.

Permit me to engage in a little trial: suppose we had a committee of three men of the calibre and distinction of Messrs. Wilson, Hughes and Taft who have been appointed to investigate the relative merits of our profession as compared with any of the irregular pathies which may have been recognized by law. It is only fair to suppose that the gentlemen composing this committee would reason from the common fitness of things and therefore know that there can be but one supreme standard of medical education and that would be the highest within the gift of man. These gentlemen would further know that any remedial agent or scientific fact would be best known by that profession which had exacted of its members the greatest degree of preparation in their scientific education. The intelligence of this committee therefore would recognize the single high standard of medicine. We are now ready for our trial and from our fruits we shall ask to be judged.

It seems to me before our trial begins the conclusion is definitely drawn, probably a shrewd lawyer at this point would ask the judge to withdraw the case in favor of the defendant. Is it really necessary for us to bring in the evidence of relative accomplishments? In the great science of preventive medicine, has anything been done other than by our regular profession? There is no work in general science, commerce or the professions which in any way measures up from the point of view of value to humanity (and certainly this is the greatest of all values) than that of preventive medicine. It is not even necessary to speak of the accomplishments of surgery of the regular profession, there is certainly no competition here with other pathies; it is lacking in dignity to bring the accomplishments of our regular profession into competition of relative merits with the many pathies which may constitute the irregular schools of our country, but, legislators humiliate us and it must come to a showdown because a single high standard of medicine must be the outcome of the reasoning processes of thinking men.

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*Presented before the Schuylkill County Medical Society.

The surgical profession is much indebted to Dr. Franklin Martin for the organization of the College of Surgeons of North America, which is our greatest effort in this country to raise the standards of surgery. A great and permanent work has been accomplished, but this powerful organization will be hopelessly crippled as long as a single institution in this country or the world for that matter, graduates an irregular practitioner of any kind. How purposeless and discouraging is it to strengthen the front door of our profession by scientific advancement if the back door is left open for the irregular to enter. Scientific men are busy with their important professional work and are too tolerant of the irregular who is taking from him the accomplishments of his scientific investigations. We do not sufficiently stand upon our dignity, the majesty of which must be measured by the salvation of life. I question if any member of our profession should accept any state health position as long as there is a single law in that state which in any way recognizes other than the regular school of medicine. I certainly would not. As an abdominal surgeon I know that over ninety per cent. of the deaths which occur in my specialty come from human errors and that a reprehensible proportion of this death rate may be laid at the door of our state legislatures.

I have mentioned Dr. Martin on account of his results from organization and standardization. Suppose he were a cabinet member at Washington as Secretary of Health (such secretary should have existed long ago) and in the performance of his duties as Secretary of Health he declared that no progress can be accomplished in the American Health Department until a single high standard of medical education is recognized; the next question which would naturally be asked by the President of the United States is: What is this standard of medical education for which the secretary has asked? He would then appoint a committee to investigate. This is where the committee of gentlemen of distinction which I early mentioned can perform the most deserved and humane services to my knowledge. There could be but one outcome to such investigation and that would be the exclusive recognition of our regular profession. It is more than likely during this investigation some members of this committee will say, "After all, Dr. So and So (naming some irregular) is not half a bad fellow, quite harmless, he manipulated my vertebræ last Wednesday and I feel better for it." It will then be the golden opportunity for some member of our profession to say "Yes, he also manipulated the vertebræ last Wednesday of one of my patients who had a perforated appendix and today I signed the death certificate."

Gentlemen, this seems to be simple, childish talk, almost playing marbles, but I want to say to you that we must get down on our knees and play marbles with the laity. They are not understanding us, more yet, they are not concerned. My message to you is, each of us must take into his confidence the most influential layman of our acquaintance, tell him these facts, show him the urgent need of proper legislation to protect our rights and permit us to follow our practice. It will be necessary in our arguments to the laity to deal in some detail, to simply say the accomplishments of preventive medicine has been magnificent is not sufficient. Remember we are on trial, therefore it will be necessary to tell them something about Jenner, the father of preventive medicine; of what the mortality of smallpox was before and after vaccination and what Jenner's great discovery accomplished. Give them the figures.

Tell them what this same principle has done in diphtheria in the salvation of millions of lives of their children. Give them more figures.

Tell them how our profession dug the Panama Canal and that the French did not fail in their engineering to negotiate this canal but that yellow fever stopped their work; tell them the story of the scientific and courageous medical men who lost their lives but demonstrated the fact that a certain variety of mosquito spread the plague of yellow fever; give them more figures and explain that this is another great step in preventive medicine. Tell them the same story about malarial fever, with more figures. You are dealing with business men, you must give them figures. Ask them what profession is guarding at this very hour every mile of coast which our country possesses to see that the great plagues are kept from us, and, if you please, ask them if any other pathy has done or is doing anything in this greatest of all work.

If this has not made an indelible impression upon them and they say: "Can you not go on with our scientific work and still permit the irregular to exist?" Your answer must be: "We can never advance or raise our standards by competing with men of inferior preparation who have no scientific therapeutic facts; they only handicap us in our work."

We must further show the laity the efforts our profession has made in this country to advance and standardize our own profession by closing over sixty per cent. of our medical colleges which could not meet the required standard, and that this has even to a larger per cent. decreased the number of our graduates of regular medicine. This, of course, gives the irregular schools an excellent opportunity to spring up all over our country. One of these institutions, I am informed, graduated more men this year than our combined medical colleges of America. How can the legislators require any degree of standardization of our profession with this damnable state of things existing? Authorities require definite standards of preliminary education, a prescribed course of medical training, a year's internship in certain recognized hospitals and then examination by state boards of examiners for results; do they get them if men of inferior preparation are permitted to practice any kind of medicine? They certainly do not.

A crippled privileged profession is more reprehensible a million times than an ignorant one. I hold American law culpable for many deaths. For the law to require a certain standard of us and then not protect us in such standardization is inconsistent with all the laws of intelligence, is a breach of faith and trust and is a personified exhibition of sheer ignorance.

241 North Eighteenth Street.

Editorial Articles

THE ABOLITION OF COCAINE

The increase of drug addiction has coincided with the increase of restrictive legislation in all directions. The statement is probably true of this country and according to reliable reports is assuredly true of Great Britain. Is it also true that drunkenness has increased in this country of late and that the increase has coincided with the advent and establishment of prohibition? Is it possible that this growth is a symptom of a neurosis known as the "nervousness of suppression?" Whether these statements be wholly or only partially true, the fact remains that drug taking is unduly prevalent in civilized countries. There are some drugs which are peculiarly harmful but which can be obtained with comparative ease because they are largely manufactured on the plea that they are called for in medical practice. One of the most conspicuous and pernicious of these drugs is cocaine, which is manufactured largely presumably on account of its value and employment as a local anesthetic, mainly by dentists. But there have been for some time fairly efficient substitutes which have no action on the central nervous system, to wit, novocaine. Recently, too, a new synthetic product known as butyn has been prepared in Chicago which, according to a statement made by Dr. W. M. Beaumont, in the *British Medical Journal,* January 13, 1923, is most satisfactory as an anesthetic in ophthalmic practice.

The argument advanced by most of those who have made a special study of the drug traffic is that the only sure means of abolishing the traffic in any particular drug is at the source of supply. If a drug is not manufactured, it cannot be disseminated through the world as cocaine is disseminated, and if a drug is not needed in medicine or surgery, as it is now said cocaine is not needed, why manufacture it? It is submitted by those who have had great experience in the drug traffic that the only mode of abolishing the use of cocaine is by international action and, as said before, this is now feasible without detriment to any department of medical or surgical practice. It is absolutely certain that as long as cocaine is manufactured it will be misused in spite of stringent legislation, some of which, like the Harrison Law and the new amendment to the British Drug Act, press hard on medical men. It is argued, therefore, that international action should be taken to end the present manufacture of cocaine in Germany and Switzerland or elsewhere and the cultivation of the coca plant in Peru, Java, Bolivia, and other countries. It is further urged that the best instrument for such action, given an instructed and active public opinion in the various countries concerned, is the opium committee of the League of Nations. Though neither the United States nor Germany is a member of the League, both of these countries are represented on the opium committee.

It is a matter concerning which there is no dispute that cocaine taking is a destructive habit and one which should be abolished if possible. It is also a matter of notorious knowledge that by far the greatest part of the cocaine manufactured is illicitly sold and misused and it has been plainly demonstrated that repressive or restrictive legislation is of little or no use. Therefore, if cocaine is not needed in medicine, surgery or dentistry, it seems that the only way to stop its abuse is to prevent its manufacture and prohibit its cultivation.

International action might prevent its manufacture on a large scale but it is difficult to understand how its cultivation could be prevented. However, the prevention of its manufacture on a large scale would greatly curtail the consumption of a drug which, when it becomes a habit, causes physical deterioration and mental debasement. In any event, the subject is one which should be discussed and freely ventilated in medical and lay journals. Formation of public opinion is a long step towards the doing away with an abuse.

THE EXAMINATION OF THE HEART FOR LIFE INSURANCE

It goes without saying that the condition of the cardiovascular system is of prime importance in the examination of candidates for life insurance. Indeed, it would be correct to state that it is the most important point in such examinations. It therefore follows, as a natural sequence, that accurate diagnosis is essential to the interests of life insurance companies, and it behooves them to have as medical examiners skillful and scientific diagnosticians. Now without unduly impugning the knowledge of the medical profession in regard to the cardiovascular system, it is undoubtedly true that the general practitioner does not, as a rule, possess that special knowledge of the heart which will render his decision final as to abnormalities and diseases of this organ. To become an expert diagnostician in this branch of medicine requires a special aptitude and years of close study. Sir James Mackenzie has taught this truth, and has been the pioneer in modern methods of heart examination. Medical examiners for life insurance companies will freely acknowledge their debt to that great Scotchman, and will no doubt further admit that they have something yet to learn with respect to the accurate diagnosis of cardiovascular diseases or defects.

The paper by Frederick W. Price, M. D., F. R. S. (Edin.), which it has been our privilege to publish, is perhaps one of the most complete ever written on the examination of the heart for life insurance, and while it does not cover the whole subject, it deals lucidly and in easily comprehensible language with the salient points. Perhaps the most instructive part of this paper, to medical examiners, is that which deals with irregular action of the heart, although all the points debated are of the first importance. However, there is no space to even touch on the various matters dealt with and reference will be made only to the remarks of the writer of the article concerning the influence of rheumatic infection of the heart in childhood upon its condition in after life.

Stress is laid on the fact that as yet it is not sufficiently realized how easy it is to overlook a rheumatic infection in childhood and it is pointed out that in trying to elicit such a history it is necessary to bear in mind that cardiac involvement is a much more frequent manifestation of rheumatic infection in children than in adults; it is, at least, as frequent an indication of rheumatic infection as any other condition and should not be regarded as a complication. It may occur in association with arthritis, which in children is usually slight, or in association with the affection confined to the tendons or the fascia in the neighborhood of the joint; in association with subcutaneous nodules, certain exudative erythemata and purpura rheumatica, which are more common manifestations of the rheumatic infection; with chorea, which is a frequent indication, and with tonsillitis which is perhaps more often of rheumatic origin in childhood than in adult life. The heart may be involved in association with an indeterminate febrile attack, or it may be the sole manifestation of rheumatism. Moreover, the point is emphasized that while endocarditis may occur acutely in children, as in adults, it often occurs in a subacute and insidious form, there being not infrequently a total absence of subjective symptoms, or, when symptoms are present they are often masked by other manifestations of the causal infection. In short, it cannot be too strongly emphasized that rheumatism in childhood in one form or another, sometimes undetectable, is a frequent origin of heart disease in adult life, which unfortunately may not manifest itself until years after the primary infection.

Dr. Price's paper is full of useful hints as to how to diagnose, with as fair a degree of accuracy as possible, various types of cardiovascular disease and derangement which can only be detected by one thoroughly versed in the methods initiated and developed by recent investigators in this wide field. This modern teaching is being applied to practical purposes by its followers, and, of course, a good knowledge of up to date methods of correctly diagnosing the numerous phases of heart affections is of supreme importance to those members of the medical profession who are called upon to examine candidates for life insurance. It is essential for prognosis which, as Dr. Price points out, is a most difficult problem, that the diagnosis be as accurate as possible, especially with regard to irregular action of the heart and to cardiac murmurs and their significance.

To recapitulate, it may be stated that the question of medical examination for life insurance is largely concerned with the condition of the heart and it is to the obvious interest of all concerned that those who do this kind of work should be sufficiently skilled to detect the signs of the more common abnormalities of the cardiovascular system and ascribe to them their true significance.

A ZURICH SURGEON OF THE SEVENTEENTH CENTURY

A curious personage certainly was this Zurich surgeon of the Seventeenth Century called by his compatriots the "barber of Thalwil"—*der Thalwyler Schärer.* It is to be recalled that at his epoch, and even for years after, barber and surgeon were coupled together. The greatest surgeons of the time began their career as apprentice barbers—among them Ambroise Paré—and this was the case with Hans Jacob Ammann, belonging to a family of barber surgeons, who was born at Thalwil on the Lake of Zurich, in 1586. When he finally settled in Zurich he acquired a more than local reputation. One of his descendants, Mr. Auguste F. Ammann, has recently told the story of his ancestor and has republished the travels of Hans in the Holy Land, from July, 1612 to September, 1613. These travels crowned long peregrinations in Germany and in French speaking parts now comprised in the Swiss Confederation.

In his youth, Hans Jacob Ammann started on his travels, not merely to see new lands, but to gain knowledge of medicine. At the age of twenty-four he was in Rome and later in Vienna where he remained four years. It was in this city that Ammann met one Negroni, an influential Greek, whom the Emperor had ordered to convey to the Sultan, at Constantinople, certain presents that were exchanged once every three years. Negroni appointed young

Ammann surgeon to the Embassy and after a trip lasting forty-two days, Constantinople was reached. At Constantinople Ammann was seized with the desire to see more and with a Dutch gentleman, an Armenian, some Turkish merchants, and two monks he set out for the Holy Land, by way of Asia Minor, Antiochus and Damascus. He traveled throughout Palestine, remained quite a time in Jerusalem and returned by way of Egypt and Italy.

The account of these travels given in his book *Reiss ins Globte Land,* published in 1618, was so successful that the book went through three editions, while the fourth has recently appeared. The text is keenly interesting. Hans was of an inquiring mind and interested in all things. Unlike the physicians of Molière, his medical kowledge, entirely derived from observation, is based on experience. On the other hand, his long travels cultivated and enriched his mind and his medical talents profited by this as well.

It should be recalled that at this epoch, Europe had still much to learn from the Orient, where the traditions of the Greek and Arabian physicians were being revived. In all countries visited, Ammann studied the medicinal plants and their healing virtues, examined into the sanitary conditions of cities, visited hospitals and the various mineral waters and baths.

Ammann returned to Zurich in 1613, established himself as a surgeon, and soon acquired a large clientele. His original mind and freedom of judgment made him very pleasing. After practising his profession for forty years, Ammann decided to return to his native village where he died in 1656 at the ripe age of seventy-two. The *Thalwyler Schärer* was a sage and most of us could profit by his views of life and things.

DR. CONSTANCE E. LONG

The sudden death from influenza pneumonia in New York City not long ago of Dr. Constance E. Long, of London, was a great shock to her patients and friends, both in this country and abroad. At the time, Doctor Long was planning to leave for England, but to return next fall to this country with a view to settling permanently in New York.

Doctor Long came from a large, noncomformist Puritan family living near Reading, England. Doctor Crichton-Miller, writing in the *British Medical Journal* says in this connection: "Brought up as she had been in this tradition . . . she had no doubt many complexes to submit to analytical treatment; but she also had that heroic urge towards the 'better than what is' that made her contribution to her day such a notable one." She commenced the study of medicine with the idea of becoming a medical missionary, but her health, always far from robust, prevented her from ever being able to undertake foreign service. After obtaining her medical degree in 1896, she held various medical posts, among them those of resident medical officer at several institutions, and later that of clinical assistant at the New Hospital for Women, the Royal Free Hospital, and Evelina Hospital. In addition, she established a successful practice, and gave courses of lectures on medical subjects in colleges and other institutions of learning. She held the office of president of the Association of Registered Medical Women, and was a member of the Insurance Acts Committee of the British Medical Association. In 1919, when the International Conference of Women Physicians was held in New York City, she was one of three British medical women chosen to attend the conference, and delivered one of the most interesting and significant addresses of the session. She was one of the founders of the British Psychomedical Society, and at the time of her death was a member of the Committee of the Medical Section of the British Psychological Society.

During her practice, Doctor Long had noticed the frequency with which the functional factor affects disease conditions, and this led her to the study of suggestion. Under the influence of Dr. Lloyd Tuckey, she became a successful practitioner of hypnotic suggestion. She was too progressive, however, to remain satisfied with suggestive therapeutics, so, in 1914, she went to Zurich, where she studied analytical psychology under Jung, and became afterward the first exponent in England of his views and practice of psychoanalysis, which had heretofore been strictly along the lines laid down by Freud and his followers. She translated into English Jung's *Collected Papers on Analytical Psychology,* was one of the editors of the *British Journal of Psychology,* and the writer of numerous articles on psychological subjects. Some of these were collected and published in her book, *The Psychology of Phantasy,* which is a simple but most interesting exposition of the principles of psychoanalysis as laid down and practised by the Zurich school.

The British medical journals have published numerous tributes to the value of Doctor Long's work. The *Lancet* says: "Doctor Long's death removes a medical woman whose breadth of outlook and wide knowledge made her well known and respected by her professional colleagues. Doctor Jung regarded her as an honored collaborator." Dr. James Young writes: "By her death, the profession loses one who strove always to further the interests of medical science, and who bravely fulfilled the arduous function of pioneer in its most difficult and exacting department—that of medical psychology. She will be mourned by all those, friends and patients alike, who knew her for what she was—a woman of kindly and sympathetic understanding who maintained an untiring devotion to duty in the teeth of the adversities of ill health and of those incidental to all attempts to broaden the basis of knowledge in any branch of human thought." Dr. H. Crichton-Miller writes in the *British Medical Journal*: "By the death of Dr. Constance Long, the profession loses a notable pioneer and a somewhat remarkable figure. . . . Those who admired her most will agree that the driving factors in her makeup were unfailing generosity and sincerity. Nobody could ever imagine that Doctor Long was acting from any ulterior or selfish motive. While she talked and wrote a great deal about that spiritual freedom which analytical treatment is intended to procure, her life showed forth much more evidently a selflessness attained in a much more old-fashioned school. . . . In all her offices her place will no doubt be filled, but her place will not readily be filled in the hearts of many friends and patients, who had learned to appreciate her wisdom, her integrity, and her sympathy."

HIRSUTES

There is always enough agitation on the surface of medicine, but its real progress is painfully slow. Particularly does this seem the case with reference to diseases of the skin. This composite organ we have immediately under our eye and hand, and yet it is safe to say that we know less about it, physiologically and pathologically, than about any important structure in the body. The textbooks on skin diseases, save on the mere side of description of lesions, are most vague and dismal pieces of literature, and, when it comes to treatment and prophylaxis, we are not greatly refreshed.

It is quite true that the skin is most intimately mixed up with the body which it covers, and reflects, to a large extent, what is going on beneath, and perhaps the skin man's retort to any critcism would be that he awaits more information about these internal organs. Still it would seem that only within the past few months has any attempt been made to find out definitely about such simple, but very important matters, as whether shaving; or the use of grease, or exposure to sunlight, affects the growth of hair. The answer of these experiments contradicts common teaching. These conditions do not increase growth.

The face and its condition, or complexion, are of more importance to man, or at any rate to woman, than any part of the body, and there is, probably, more suffering (mental, but none the less real) on account of facial blemishes and, in particular, superfluous hair, than from all other skin diseases put together. Electrolysis has been recommended above all other means of treatment, but it is expensive, painful, and often well nigh endless, as it must be repeated time and again, because follicles are missed or because of new growth due to stimulation.

Women have had an aversion to the use of a razor, an aversion due probably, to a large extent, to the popular notion that the cutting of hair causes it to grow faster and become stiff. It is to be hoped that the results of the experiments referred to will help in encouraging a further use of this weapon. No one seems to have investigated the question of whether there is a stimulation to growth from the use of chemical depilatories. These are in wide use under one name or another, and one prominent dermatologist has dared to say that they are not so bad as is often made out. Some dermatologist will do humanity a world of good by laying his finger on the cause of hirsutes and by discovering a means of its prevention or actual cure.

PROTECTION

The physician is notorious as a poor business man. He spends his life in an elaborate preparation for his work, ministers to the sick, prolongs and protects human life to the best of his power and usually ends by neglecting his own health and in turn the welfare of his family. His enthusiasm and earnestness carry him away from his own security. His main capital is his skill and personality. Should these in any way be interfered with he is handicapped much more than most of the men in other professions or those in business.

For these and other reasons he should make some adequate provision for the care of those dependent upon him in the event of any impairment of function due to accident or disease. He should protect himself even as he seeks to protect others. This advice is given from a purely utilitarian point of view. It is not a question of sentiment but rather one of common sense or business.

Just how might he best secure this protection has been studied by certain life insurance organizations. They have devised plans whereby his needs were carefully considered and have perfected systems which are in the nature of business investments which in turn serve to protect him from the many contingencies which he may encounter. The question of this more modern and specialized life insurance for men in the professional ranks is meritorious and should be investigated by all physicians. It is merely a question of fulfilling their duties to themselves.

GYMNASTICS FOR INFANTS

The age of gymnastics probably reached its height in the latter half of the nineteenth century and, fortunately, has been waning. Begun by able enthusiasts who too often made physiology and anatomy to suit their theories, gymnastics became the money making field for sundry charlatans who preached their various systems from the housetops. Probably none of these systems did much harm to adults, but some even went so far as to apply them to the newly born.

So far as we know, no physicians in this country have "taken up" with this attempt at precocious physical development, but within a year two articles have appeared in the medical literature of Central Europe. Possibly the condition of young children in those war drained States has made it seem needful to do something more than let them grow up naturally, but these physicians have made the mistake so common among advocates of physical training, that of putting the cart before the horse, or, in other words, the exhibition of energy before its source. Exercise in children is but the expression of abundant energy, and overflowing energy means plenty of food. Given normal nutrition, a child cannot be prevented from exercising. Moreover, it is far safer to let him choose his exercises for himself. It may be well to pick up and handle a child under one year, but a child of that age needs no special apparatus or exercises for his development.

When it comes to children of school age, they too will exercise if they are well fed and have half a chance, but the last form of exercise we should offer is that of formal gymnastics, and then only as a makeshift. Educators have been, theoretically, believers in Herbert Spencer's *Education,* but they have paid little or no attention, practically, to what he has to say against formal gymnastics. They may do for school children where nothing better can be offered, but certainly they have no place in the nursery, for they are pretty certain to be more harmful than beneficial.

THERAPEUTIC HAND WEAVING

The curative value of working with the hands is receiving constant recognition in the installation of occupation therapy in the increasingly large number of hospitals and other institutions. But there are as yet almost no opportunities for taking advantage of such work outside of institutions. Perhaps the first step to furnish such opportunities has been taken by two young women of this city, Miss Edith Snow and Miss Beatrice Abbott, who have recently opened a studio for the teaching of hand weaving at the Art Centre, 65 East Fifty-sixth Street. Miss Abbott and Miss Snow are members of the American Occupational Therapy Association, and have the endorsement of many well known members of the medical profession. It is desired that pupils work under the direction and with the cooperation of their own physicians. Weaving has been proved to be, in the institutions where it has been tested, one of the two or three crafts most important in occupation therapy. It has several distinct advantages for both doctor and patient. In the first place, it is an interruptible craft, hence the amount of time and concentration to be given by the patient can be regulated by the physician. Then, the process may be either largely mechanical, in which case, the rhythm and exercise gained from manipulating the loom are restful, soothing and beneficial to the patient; or interesting and beautiful effects may be produced, which furnish an immediate incentive to the pupil. Also, the work requires close but not strained attention, and develops patience and initiative. Perhaps the chief curative principle involved is the training of emotional control. The worker must learn to govern, not only his machine and his design, but also himself, if he is to get results; yet this process is neither arduous nor tense. Thus interest, adaptation and habit lead to control.

SPECIAL CLASSES IN ATLANTIC CITY

In a small but most attractive pamphlet of only twenty-four pages, Charles A. Boyer, superintendent of the Atlantic City Public Schools, brings before teachers and the general public valuable information about classes for subnormal children. The pamphlet deals with the organization and management of such classes in the public schools of Atlantic City. These classes were organized before the passage by the New Jersey General Assembly of the law making special classes mandatory, and have now been increased to eight in number. All children are given the Vineland (1919) Binet and Porteus tests. No child with an intelligence quotient above seventy-five, nor with a Binet above ten is admitted. All children are reexamined annually. There is no hard and fast rule about keeping children in special classes. Children who show signs of mental weakness should be examined early in their school life, for when admitted later they have formed already poor work habits, and it is often difficult to arrange a program suited to their ability. In a discussion of the problem of feeblemindedness, four channels of attack are given: 1, education, to develop all that the children have, both physical and mental; 2, legislation, in an attempt to control the mating of individuals in society, so as to insure normal children; 3, segregation, or institutional care; 4, surgery, which, in the male, consists of a ligation and resection of a portion of the vas deferens, and in the female, severing the fallopian tubes. The only true solution of the feebleminded problem is institutional care. These children have no place in a city school system where they come in contact with normal children. The pamphlet has a number of excellent and suggestive illustrations of various phases of the work. It should be of great value to the teacher, nurse, or physician interested in this aspect of medicine and education.

PROPER CREDIT

Dr. Harry R. Litchfield and Dr. Leon H. Dembo, whose article on Clinical Errors in the Diagnosis of Acute Contagious Diseases appeared in the March 7, 1923, issue of the JOURNAL, wish to call attention to the fact that the reference to "pin point pearly white spots occurring occasionally on the congested caruncle on the inner canthus of the eye, two or three days before the morbilliform eruption" was first pointed out to them by Dr. I. H. Goldberger, of New York.

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News Items.

Fight Diphtheria in Milk.—A dozen scientists from all parts of the Eastern States are at the Borden plant at Endicott, N. Y., experimenting on methods to eliminate permanently the danger of diphtheria infection from the milk supply of the country.

Dr. Wallace Resigns.—Dr. Charlton Wallace has resigned as surgeon in charge of the Reconstruction Hospital, 100th street and Central Park West. It was learned that the trustees of the hospital had indefinitely postponed the contemplated erection of an eleven story building to cost $1,500,000.

Lorentz on League Board.—The Council of the League of Nations at Geneva has elected the Dutch physicist, Hendrik Lorentz, to membership on the Commission on Intellectual Cooperation. He replaces Professor Albert Einstein, who recently resigned. Dr. Lorentz is a foreign associate member of the French Academy of Sciences, professor of philosophy at Leyden, Holland, and an honorary member of the Royal Institute of London.

Radio Medical Service for Seamen.—Just a year ago the United States Public Health Service announced that it had completed arrangements to expand the medical aid service to American seamen, with which it had first been charged by Congress a century and a quarter ago, by prescribing by radio for any sailor who might be taken ill at sea and who might apply. The diseases and mishaps for which aid has been invoked includes appendicitis, asthma, cramps, diarrhea, earache, eye injuries, heart disease, hernia, hiccoughs, influenza, infected teeth, malaria, opium poisoning, ptomaine poisoning, and swallowing broken glass. Sometimes interchange of several messages was necessary to obtain clear information as to the cause of the trouble.

Medical Health Centre.—The Medical Health Centre for the Treatment and Prevention of Disease, 231 West Fifty-first Street, New York City, is an institution which was founded in order to help those requiring the attention of specialists, who are without the financial means for such care and who do not wish to accept charity treatment. It was established also to supply a central place where the public may go for consultation and then return, if they wish, to their own physicians for treatment. Information about the prevention of diseases is also supplied. The Medical Centre specializes in the treatment and prevention of skin, kidney, bladder, blood, and genitourinary diseases. Other specialties will be added as the institution grows. The work of the centre is carried on purely as a philanthropy. Charges are nominal and the proceeds are used to cover the expenses of maintenance and educational work.

Alpha Omega Alpha to Meet. — Syracuse Chapter of Alpha Omega Alpha will hold its annual public meeting at the First Baptist Church, Syracuse, on Monday evening, May 14, 1923, at 8:30 o'clock. An address entitled Treatment of Chronic Cardiac Diseases will be presented by Dr. H. A. Christian, Hersey professor of the theory and practice of physic and former dean of Harvard Medical School.

Nursing School Founded at Yale.—On April 24th, at New Haven, Conn., President Angell announced the establishment at Yale of the first university undergraduate school of nursing in the United States, the funds for which are to be provided by the Rockefeller Foundation.

Woman's Medical Society Convention.—The Women's Medical Society of New York State will hold its seventeenth annual convention at the McAlpin Hotel, Thirty-fourth Street and Broadway, Monday, May 21, 1923. This meeting is to be called at 9:30 a. m. and the banquet set for 7 p. m. The scientific program has been announced and may be obtained from Dr. Rosalie S. Morton, 26 East Sixty-third Street, New York City.

Hospital Has Celebration.—The New York Nursery and Child's Hospital at Sixty-first Street and Amsterdam Avenue, celebrated its one hundredth anniversary. It is the oldest children's and foundlings' hospital in America and the first maternity hospital to complete a century of service. In that time 75,000 babies have been born there. The hospital was founded on April 29, 1823.

Pharmacopœial Trustees Entertained in Cincinnati.—The Board of Trustees of the United States Pharmacopœia met in Cincinnati on May 4th and 5th for the transaction of business connected with the publication of the tenth edition of the United States Pharmacopœia, the manuscript of which is rapidly nearing completion. The members of the board in attendance at the meeting included: Dr. Solomon Solis Cohen, Philadelphia; Dr. Henry M. Whelpley, St. Louis; Dr. James H. Beal, Urbana, Ill.; Dean F. J. Wulling, Minneapolis; Prof. E. Fullerton Cook, Philadelphia, and Samuel L. Hilton, Washington.

London Fellowship of Medicine.—At a meeting of the Fellowship of Medicine held on Friday, April 13th, at the Royal Society of Medicine, a plan, brought forward by the nonundergraduate hospitals in London was accepted to take immediate steps to meet the needs of two classes of postgraduate students, those requiring short general refresher courses and those requiring advanced courses in the special departments of medicine and surgery. The short refresher courses will centre in a general nonundergraduate hospital, and each group will be responsible for three or four such courses during the year. The programs will be begun by a course at the Prince of Wales' General Hospital, Tottenham, assisted by the special hospitals belonging to the North Eastern Group, from June 11th to June 23rd. For graduates requiring more advanced instruction each of the special hospitals will undertake two or three courses during the year and in these it is hoped that specialists from the undergraduate hospitals will be willing to come to the special hospitals at the invitation of the staff to assist in lectures and demonstrations.

VIENNA LETTER

(*From our own correspondent.*)

VIENNA, *March* 30, 1923.

(*Continued from page* 505)

ANTISEMITISM IN VIENNA.

I mention all this because the American public is not conversant with it, and therefore cannot possibly grasp the present issue. In Austria, Germany, Hungary and Poland, antisemitism is not a movement like our own Ku Klux Klan, but much more widespread, and I believe that one of the accused would-be murderers in the Harden trial in Germany well nigh spoke the truth when he stated that fifty per cent. of the German people stood at his back, and that he would persevere on the path once taken.

While I was chairman of the reorganized American Medical Association of Vienna for ten months, I had plenty of opportunity to get into intimate contact with the present teaching staff of the medical faculty. The courses most favored by our American confrères over here are those held in the eye, ear, nose and throat departments. About seventy-five per cent. of the American physicians here attend those clinics. The ear clinic is in charge of Neumann, the throat and nose clinic of Hajek, and the skin courses held by Professor Ehrmann are quite in favor. All three are Jews, and so was the late Wertheim, a brilliant professor whose gynecology and obstetrics courses were popular with American physicians. The chair is now occupied by Kermauner and Peham, whom nobody knew outside the Court of the Hapsburgs. Professor Halben, a Jew, did not get the chair in spite of his epoch making studies on ovarian hormones. Whenever there is now a vacancy at the university, the chair is given to men for their political convictions, not for their scientific achievements. A case in point is the chair for pathological anatomy, vacant since the death of Weichselbaum. The Senate of the university offered this position to Aschoff, of Germany, who suggested, while refusing to accept the chair, the Viennese pathologist Sternberg (a Jew) as the proper candidate. Another case in point is Professor Leopold Freund, who brought before the Medical Association of Vienna the first case of hypertrichosis treated successfully by röntgen rays twenty-five years ago. He was the first man who recommended the use of x rays in the treatment of infectious skin diseases (favus, sycosis, herpes tonsurans). His first communications were met with great incredulity and scepticism on the part of the rest of the faculty, and in spite of the fact that Professor Freund was the pioneer in our knowledge of the biological and therapeutical effects of röntgen rays, his genius was never given a fair chance at the clinics of Vienna—simply because he was a Jew.

The present incumbent of the chair of röntgenology, Professor Holzknecht, recognized Freund's great merits, and even admitted—in the course of a session of the Medical Association of Vienna, held October 27, 1922—that he, Holzknecht, had had to abandon his own method and go back to the method of treatment advocated twenty-five years ago by Freund. Yet Freund, who is a Jew, is sidetracked, and will remain so for the rest of his life. Court Counsellor Professor Eder also pointed out the great merits of Freund in an editorial in the *Neue Freie Presse* of January 6, 1922; but Freund was not given any department, any opportunity to unfold his genius —he is a Jew.

This tendency to purify the faculty of Jewish talent is rampant just now, and—in my opinion—it constitutes one of the many reasons for the downfall of the medical faculty of Vienna. The present rector of the university, Karl Diener, found the courage to advocate publicly the exclusion of Jewish students and Jewish professors from the university, and seconded the demands of the German-National students as regards the restriction of the attendance of Jews to ten per cent., thus following the example set by highly civilized Poland and Hungary with their numerous clauses. At the same time he extolled Eduard Suess, his teacher and former rector of the Vienna University, in a eulogy describing him as one of the greatest of pathfinders, not omitting to mention his teacher's Protestant faith. He was evidently unaware of the fact that the mother of Suess, Zdekauer by name, was of Jewish extraction.

When the committee of bankers and industrial magnates, whose contributions help to keep the university from closing its doors, threatened to stop their contributions to an institution of sham freedom of thought, the Academic Senate of the University resolved, at its session of December 19, 1922, to contradict the political enunciamento of its rector by stating that the demands of the German students could not form the basis of negotiations, because they were not in conformity with the State laws.

While the university thus, so to speak, saved its face, it remains an undubitable fact that political parties dominate the university, that political influences mete out the vacant chairs to the followers of the various political bosses. It is the same atrocious element which murders men like Rathenau, Harden and others. A defeated race seeks its scapegoats.

VIENNA COMMERCIALIZED.

Vienna, the easygoing city of the continent, the city of artists, musicians and poets, is undergoing a painful metamorphosis—it is assuming all the earmarks of a commercial city. This statement is borne out by the disappearance of a great number of the coffee houses for which Vienna was once famous all over the world. These coffee houses served a manifold purpose; one could not only—in former times—get a cup of delicious coffee and cake there, but they were the meeting places of many business people, who transacted their business at the various tables, thus saving themselves the expense of maintaining costly offices; and they were the *rendezvous* for society, where many a young man met his fate. Some of the best known coffee houses also leased part of their space for private social gatherings, dances, clubrooms and so forth. In place of these coffee houses we now find new banks. A large number of these have shot up all of a sudden, like mushrooms after rain. The bankers were apparently the only people who could pay the exorbitant lease demanded by the coffee house proprietors. Considering the endemic gambling disease which has taken hold of the entire population—fortunes have been made and lost every day on the stock exchange by gambling in *valuta*—the socalled bankers were apparently the only people who made money.

In the place of a good many of the coffee houses we also find large offices for the purpose of handling the transit business between the newly born, independent states (Poland, Czecho-Slovakia, Jugoslavia) and the North, West and South of Europe. Vienna, due to its geographical location, seems to be predestined to functionate as a warehouse between the East and the West, the North and the South of Europe.

The people at large have lost all their idealism; they are quite mercenary. While the Viennese always looked upon foreigners as easy marks (*Würzen*), they have added to their peculiar easy going charm a new trait—that of raw arrogance. Wherever and with whomsoever one speaks, whether the person belongs to the laboring socialistic classes, to the intellectual middle classes or to the dethroned, formerly leisurely living aristocratic classes, after a short time one is bound to hear the remark, "Just think! this used to cost two kronen, now it costs three thousand kronen." All their thoughts are taken up in drawing comparisons between the former price of things and their present price.

No class of people has been struck so hard by the depreciation of the money as the older generation, who thought they could live, in their declining years, on the interest on their hardearned savings. The real estate owners and house owners have been getting no income at all because the law, introduced by the socialistic party, prohibited the increase of rents, thus bringing the landlords face to face with beggary. The net yearly income of a fourstory house —if there was any net income at all—equaled the price of a loaf of bread!

The quarter million of state employees and the laboring men suffered less, on account of the enactment of the index law, which was administered by a committee kept permanently busy figuring out the cost of living for every month; the more the money depreciated, the higher was the cost of living. The index law simply stated, for instance, that the cost of living for the past month was seventy per cent. higher than in the previous month, and the salaries and wages of all employees, State and industrial, therefore had to be automatically raised by seventy per cent. No matter how much the money depreciated, it is thus evident that the working classes always received wages correspondingly higher. More "money" had to be printed, and with the increase of printed paper money, its value again fell. It was a vicious circle, which nobody could stop. And the masses of the people did not care because, after all, they always got equivalent money, although they could not do more than buy mere necessities with those big wages.

As most of the food products, coal, wool and leather had to be imported and paid for in foreign coin, the people soon paid no attention to the thousands of kronen they got, but merely asked themselves, "What amount of food, clothes, shoes, coal, and other commodities can I buy with that sum?"

The newly arrived foreigner, who thought himself a very liberal, freely tipping person, soon found out that the thousands and ten thousands of kronen he was meting out for tips were not appreciated. Everybody wanted foreign coin. I understood, for instance, why the nurses at the clinic at which I was working did not even thank me for the pound of ham I presented to them. "Of course," they said, "it's only a dollar you gave us, and what is a dollar to you?" And when I asked one of them to please help me into my fur coat, she stepped aside with "Oh, not *I*!" Then the other came up and said, "Oh, but *I* shall help the Doctor! It means a bottle of wine for Christmas." Think of such a frame of mind in people who were supposed to assist the sick.

Everybody, from the street urchin to the professor, has been gambling on the Stock Exchange, speculating on the fall of the kronen. One day, when two dogs were needed at the clinic for some experimental work, the *Diener* (servant) asked me four thousand kronen apiece. I wondered at the big price, whereupon he immediately retorted, "Oh, what's that to you? Not even half a dollar!" He did not know that I had changed my dollars a month ago, when I got only seven hundred kronen for the dollar—not eight thousand, the price the dollar commanded a month later. He evidently did not realize that four thousand kronen meant six dollars to me, not half a dollar.

Is it to be wondered at if, under such conditions, every foreigner should be considered as a cow to be milked? That every American was asked by the professors to pay forty to one hundred times more kronen for the teaching hour, in the courses given, than any other foreigner? I pointed out that discrimination against Americans, which was going on at the clinics in the American Medical Association's circular of March, 1922, and when our committee argued with the committee of professors for hours on the injustice of such procedure, the professors insisted that their mental goods did not depreciate as compared with what they were before the war, and that was sufficient reason for Americans to have to pay the prewar prices. But Americans refused to pay more than French or Swiss or English physicians had to pay. So the professors tried to break up the American Medical Association organization—they did not like the idea of being checked up too closely. There were always enough Americans who would pay any price to get the time of this or that teacher and the teacher thus overpaid by one or two Americans had no time left to give courses to the "cheap skates" of the organization, and the organization really would have been destroyed if we had not published broadcast the statement of March, 1922, about the medical profiteers of Vienna. This move—and this move only—made it imperative for the teaching staff to have the statement publicly retracted by the American Medical Association. The American Medical Association did so, after all their demands for fairness had been granted, and the fighting officers made way for a new set of peace officers.

This fight of ten months' duration revealed to me such an appalling decadence of ethics and morality, such a lack of the sense of justice and fairness among a class of people supposed to rank as leaders of the cause of truth and fighters of lies, it has revealed to me such a base level of mind and soul in the teaching staff of what was once one of the most renowned universities, that I was at a loss to understand it until I began to look upon them as a mere part of the people at large—a people at large utterly decadent.

(*To be continued.*)

Book Reviews

THE TRIALS OF THE YOUNG PHYSICIAN

Doctor and Patience. By HAROLD M. HAYS. With Introduction by Dr. Alexander Lambert. Boston and New York: The Cornhill Publishing Company, 1923.

Dr. Hays has earned an enviable reputation as a surgeon and a writer on medical topics pertaining to his specialty. We fear, however, this attempt to portray, in the form of a novel, the trials and tribulations of a young physician beginning practice in a large city like New York will not add materially to his standing as a writer of fiction. Though nobly conceived, the author has not succeeded in drawing his characters convincingly. The hero, it seems to us, is too virtuous, and his faults, if he has any, are so few that he must have died very young. He was altogether too good and too innocent to live long in this dreadful world; and we believe his awful horror at the friendly suggestion that he "split" fees for referred cases would hardly meet with much sympathy from many of the surgeons who are filling our hospital beds with operative cases, not only in New York but throughout the country.

The villain, also a doctor, comes to an untimely end by violence, according to the rule that the wages of sin is death. But he wasn't such a bad fellow at heart, in spite of his illegal doings. Our hero seems to look at him through a one track eye, if such an expression may be permitted, seeing only the obvious black in him but entirely overlooking the hidden white which even the greatest sinner among us has in some measurable degree. One character that stands out like a giant among pigmies is Evelyn, the doctor hero's practical wife. Her picture is well drawn and she typifies the difficult and sacrificing life which most doctors' wives live. Without her aid and comfort we wonder what sort of a hero our hero would have been.

The volume makes an interesting hour's reading, and can be read with profit and pleasure by doctor as well as layman.

THE NEW PHYSIOLOGY

The New Physiology in Surgical and General Practice. By A. RENDLE SHORT, M.D., B.S., B.Sc. (Lond.), F.R.C.S. (Eng.). Fifth Edition, Revised and Enlarged. New York: William Wood & Co., 1922.

Because of the rapid changes in our views of the relation between physiology, on the one hand, and medical and surgical problems, on the other, the author has practically rewritten each of the editions of this useful and popular work, which have so rapidly succeeded one another. The present volume, therefore, may be accepted as being practically a new book. Three entirely new chapters appear in this edition, treating of the dietetic factor in the etiology of appendicitis, the functions of the kidney, and the physiology of muscular exercise. Herapath has rewritten the chapter on the heart. The physiology of the genital glands in both sexes is fully considered in the light of the most recent studies.

Commenting on the twenty-four chromosomes with which the human fetus starts life, and in which, quoting Weismann, its entire heredity is bound up, including the impulse to assume the general shape of mankind; more or less resemblance to the facial appearance and even the tone of voice and character of its parents—the author wonders how all this is crowded into such microscopic objects and considers this the greatest marvel in biology.

The work is attractive, both instructing and entertaining. There is a vast fund of information, valuable not alone to the physiologist, but to the active physician and surgeon whose daily work must necessarily depend on a practical and up to date knowledge of the physiological functions of the various organs of the body.

PRACTICAL PHYSICS

Practical Physics. By J. A. CROWTHER, Sc.D., F.Inst.P., Sometime Fellow of St. John's College, Cambridge. London: Henry Frowde and Hodder & Stoughton, 1922.

The volume under review is intended by the author to cover the practical work in physics which usually is demanded of a student entering a medical school. It is distinctly elementary in character; nevertheless it covers a vast amount of ground and presents the subject in an interesting and instructive manner which must make its appeal to the student.

The author has divided his subject into five books—practical measurements, mechanics and hydrostatics, heat, light and sound, magnetism and electricity. One hundred and forty-four experiments are fully described, each preceded by a statement of what is intended to be proved. The illustrations are clear, simple and plentiful, and the typography is all that could be desired. The work will be distinctly valuable to the student and a welcome addition to the many that have preceded it on the same subject.

COLLECTED PAPERS

Mitteilungen aus der Medizinischen Fakultät der Kaiserlichen Universität zu Tokyo. xxviii Band 2. Heft. Tokyo: Verlag der Kaiserlichen Universität, 1922.

N. Sekita reports the results of his experimental studies on phosphorus poisoning, including the effect of glucose and alcohol upon the fat changes, the respiratory metabolism, the fate of the introduced glucose and the disturbances in the synthesis of urea in animals poisoned by phosphorus.

E. Komiya contributes some facts on hyperchromatic anemia. Four cases are reported, together with their histories, and the blood, necropsy and histological findings. The diagnosis is discussed and the various theories on the subject are criticized, giving special attention to the significance of megaloblasts and the changes in the color index, the size and the volume index of the erythrocytes.

T. Ishikawa reports on the pseudoleucemic changes in the external skin and eyelids. The histology, together with the necropsy, hematology and histology of a case are given. The histological changes in the skin are carefully investigated, including the absence of lymphocytic infiltration in the subpapillary zone and the mitotic figures in the lymphatic foci. The cause of the aleucemia, the hemorrhages into the lymphatic foci of infiltration, the origin of the pseudoleucemic skin changes and the pathogenesis are discussed. The histology, pathogenesis and origin of the pseudoleucemic tumor of the eyelids and the pseudoleucemic changes in the eyeball are also taken up.

S. Nakagawa contributes his studies on ferments as to the lability of the sojaurease and on the socalled auxoureases and coenzymes. The lability of the sojaurease in dilution and the relation between temperature and ferment destruction during the activity of the ferment are discussed. The action of auxoureases were tested with serum, casein solution, solution of Witte peptone, glycocoll, ajinomoto and sodium nucleinate. The experiments on the coenzyme of sojaurease were conducted with boiled ferment solution, ferment solutions previously treated with alkalis and with dialyzed ferment solution. Experiments were also conducted with the ash consituents and with the germinal urease of glycine hispida. The effect of the total volume of the digestive mixtures upon the ferment activity was also investigated.

SPIRITISM

Subjective Concepts of Humans Source of Spiritistic Manifestations. By John J. Donnelly. New York: The International Press, 1922.

The author of this book has substituted for formerly accepted adherence to orthodox religion a strange animistic theory of mental activity as it operates in the relations of human beings. His interest is chiefly in carrying this over to a spiritistic world, which he explains by his concept. His statement is "that the intelligence of each sentient being begets a subjective concept of each sentient being met, and with whom it exchanges mutual recognition." The development of his idea of the spiritual world and his descriptions of mental life take him along a foggy path of thinking which touches on one hand upon some facts of pragmatic truth but on the other brushes too closely upon fantastic conceptions, his own dogmatic assurances of which fail to convince the reader.

ENLARGEMENT OF THE PROSTATE

Enlargement of the Prostate: Its History, Anatomy, Etiology, Pathology, Clinical Causes, Symptoms, Diagnosis, Prognosis, Treatment; Technique of Operations and Aftertreatment. By John B. Deaver, M.D., LL.D., Sc.D., F.A.C.S. Assisted by Leon Herman, B.S., M.D. Second Edition, with 142 illustrations. Philadelphia: P. Blakiston's Son & Co., 1922.

Deaver emphasizes the fact that the surgery of prostatic obstruction has been perfected to a remarkable degree since the publication of the first edition of this work some fifteen years ago. In the earlier work he advised prostatectomy "only after all palliative means had been tried without success"; in the present work the operation is recommended as a primary procedure, being considered far safer in the average case than any form of palliation. While the author makes no pretense at presenting anything that is new in this volume, he has aimed to make the work distinctly practical in character and therefore has eliminated many of the theoretical considerations and refinements in technic proposed by various authors, which merely serve to confuse the reader by their multiplicity and contradictory claims. The same method has been applied to the consideration of the laboratory tests, only those that have been tried and found useful being considered at any length.

The work is written in Deaver's characteristic style and thoroughly covers the subject. The preoperative and postoperative methods of treatment are fully described and constitute a valuable contribution to this highly interesting and useful work.

EXPERIMENTAL BACTERIOLOGY AND INFECTIOUS DISEASES

Die Experimentelle Bakteriologie und die Infektionskrankheiten mit besonderer Berücksichtigung der Immunitätslehre. Ein Lehrbuch für Studierende, Arzte und Medizinalbeamte. Von Dr. W. Kolle, Institutes für experimentelle Therapie in Frankfurt a Main. Sechste, umgearbeitete Auflage. Ester Band. Mit 41 grösstenteils mehrfarbigen Tafeln, 79 abbildungen im Text und 7 Kartenskizzen. Zweiter Band. Mit 73 grösstenteils mehrfarbigen Tafeln, 135 Abbildungen im Text und 5 Kartenskizzen. Berlin und Wien: Urban & Schwarzenberg, 1922. Pp. xvii, xi, 1376.

A sixth edition and the translations into several languages are evidence of the popularity and excellence of these two volumes. Both the authors and the publishers are to be congratulated upon this publication. It deals exhaustively with this very extensive subject, not only as it was elaborated in Germany but also, to a great extent, as worked up by foreign laboratories. Emphasis is laid upon the important results of recent investigations and the difficulties encountered are pointed out to pave the way for future research, especially in the fields of epidemiology and the prophylaxis of epidemics.

Much new material has been added and there are many rearrangements of the material in this edition. An extensive and up to date (1921) bibliography is appended at the end of each chapter. The work is of great value to the pathologist, health official, epidemiologist, hygienist, physician and student and it should be part of the equipment of every pathological laboratory. The marginal headings enhance its value as a reference book. The illustrations are excellent and the delicate shades of coloring are such as are rarely seen. Both the practical and theoretical aspects of infectious diseases and laboratory work from the bacteriological viewpoint are taken up. The principles of immunity are given special consideration.

The first volume deals with the microscope and microscopy in all its branches; the general morphology and biology of pathogenic microorganisms; the disinfectants and the fundamental principles of disinfection; infection, infectious excitants, their specificity and the mixed and secondary infections; immunity, protective inoculations and the production of protective and curative sera in practice; antitoxins, bacteriolysins, agglutinins and precipitins; serodiagnostic methods of examination; anaphylaxis and general remarks on bacteriotherapy and serotherapy; and the various specific bacterial diseases. A considerable part of the second volume is devoted to the various spirochetal diseases and the chemotherapeutic problems, with special consideration of the chemotherapy of syphilis. Among the rare and tropical diseases, trypanosomiasis (animal and human), the coccidia, the piroplasmodia, the filterable disease excitants, papatacci and dengue fever, lyssa, foot and mouth disease, verruga peruviana, rinderpest, five day fever, filariasis and bilharziasis are considered with much more detail than is usually given these subjects. The infectious diseases of unknown origin are treated.

The thread fungi and yeasts are also discussed. In short, there is little, if anything, that was omitted from this monumental and beautiful work on experimental. bacteriology and infectious diseases.

OPOTHERAPY

L'Opothérapie du Practicien. By L. LEMATTE. Paris: A. Maloine & Fils, 1923. Pp. 239.

This is a practical little book suited to guide the general practitioner to an intelligent use of glandular substances in medicine. In simple manner the writer presents the various forms in which these may be used with the methods of preparation which give them greatest efficacy. Methods of administration are also given. A large part of the book is devoted to the maladies in which opotherapy is of service.

COUEISM

Coué for Children. By GERTRUDE MAYO. With a Preface by Emile Coué. Illustrated. New York: Dodd, Mead and Company, 1923. Pp. viii, 126.

There are many individuals of keen discernment who realize more and more the lamentable fact that the mass of people will not think for themselves. Or in the words of Freud, men and women everywhere shrink from facing reality. When and how would this evil ever be corrected if Couéism were able to spread itself over adults and children alike? Immediate advantage is no doubt brought about, even as this fulsomely enthusiastic author truly reports. Yet it is easy to detect the ground of the effect in a psychic attitude of transference, in a confidence based upon dreamy ideals the wholesome lasting effect of which one may well question. The further effect of encouraging in the younger members of society that attitude of trustful submission rather than cleareyed question, mumbling of magic formulas rather than resolute gripping at stern facts themselves, is a menace which may well be faced. "Caressing them tenderly and talking to them softly," words quoted by the author of this book from Coué himself, gave a note of the danger to the psychic stamina which is only too well known by the psychoanalyst. No human method but must touch upon some truths. So it is with Couéism as here presented. But the few glimmers of truth are in a dangerously false setting.

COLLECTED PAPERS

Selected Papers and Addresses. By WILLIAM WILLIAMS KEEN, M.D., Philadelphia: George W. Jacobs & Co., 1923. Pp. 340.

The papers collected into this small volume appeared originally in various periodicals throughout a number of years. They are on many subjects and for many types of reader, including the physician, the educator, the missionary, the historian, the soldier, and the layman. Dr. Keen in his preface requests the reader to keep in mind the fact that they were addressed to wholly different audiences at wholly different times; and also to bear in mind their dates, since progress in knowledge and in technic have altered many viewpoints. Essays of special interest to physicians are: The graduation ceremony, with an account of some modern surgical celebrations, a short history of such occasions, ancient, medieval and modern; the community of interest of the medical school and the public; before and after Lister; dangers of ether as an anesthetic; story of the three tablets (to Dr. James Markham Ambler, of the Arctic exploring steamer *Jeannette;* Dr. Jesse W. Lazear, who offered himself as a subject for yellow experimentation; and Dr. William M. Wightman, who died from the same cause); a world of billions (a study of the blood); the red cross and the antivivisectionists; some of the things we surgeons as a profession stand for; and vivisection.

MEDICINE

Lehrbuch der Grenzebiete der Medizin und zahnheilkunde, für studierende, zahnärzte und Arzte. Bearbeite und Herausgegeben von Dr. JULIUS MISCH. Zahnärzt in Berlin. Zweite Band. Second Edition. Leipzig: F. W. C. Vogel, 1922.

This volume is the joint work of a staff of colaborators as follows: dermatology by Ledermann; gynecology by Büttner; rhinolaryngology by Finder; otology by Gutmann; occupational diseases by Koelsch. The editor has collaborated in each of these sections as a stomatologist. The number of pages is 672 with 351 illustrations which include a number of fine colored plates. The two detached volumes which make up the work of Dr. Misch appeared originally in 1914 in a single binding. In the absence of the first volume it is impossible to give the present one an adequate review.

SURGICAL ANATOMY

A Manual of Surgical Anatomy. By LEWIS BEESLEY, F.R.C.S. and T. B. JOHNSTON, M.B., Ch.B. Second Edition. New York: William Wood & Co., 1923.

This is an exceptionally good work on surgical anatomy. The illustrations are clear and well interspersed with x ray plates and diagrams in color, showing various anatomical structure. The index is well arranged so that one is able to find almost any anatomical structure. The authors have a thorough knowledge of surgery as their surgical descriptions of procedures are excellent. The reviewer can thoroughly recommend this work.

ANATOMY

A Manual of Practical Anatomy. Part III. By THOMAS WALMSLEY, New York: Longmans, Green and Company, 1922.

This third volume completes the set of dissectors written by Walmsley. The former volumes were reviewed in this JOURNAL. This last one is in keeping with these and the entire set may be commended to the student of anatomical dissection.

FIRE AND ICE

The Long Journey. By JOHANNES V. JENSEN. Translated by A. G. Chater. New York: Alfred A. Knopf, 1923.

In vivid, poetic form Jensen has given birth to this first volume of the trilogy of mankind. It makes wonderfully interesting reading, even to the person unacquainted with the details of geological and anthropological growth. Coming as it did for the reviewer on top of Carveth Read's *Origin of Man* it was as a breathtaking illuminated text of all one's readings on the subject. In short, it gives the picturesque final form to our ideas about the whence and wherefore of most things. We await anxiously the other volumes to see whether the thousand years of man's increasingly rapid whirling through intelligence has been as fascinatingly and skillfully depicted as his billions of years of groping to human thought.

HUMOR IN THE DRAMA

Mary, Mary, Quite Contrary. By St. John G. Ervine. New York: The Macmillan Company, 1923.

A very light playlet on a theme of elemental simplicity. The temperamental actress alternately lives up to her vagaries and astounds the public by demonstrations of shrewdness and a woman's heart. Lay figures, all of them, strutting as we like to have them, and for that reason disappointing to those of us who have appreciated the fine reality of Ervine's earlier plays. One can pick the preordained laughs from the page. An ideal play for the graduating class of a high school! No problems, no sexy dangers!

ANGER

Anger: Its Religious and Moral Significance. By G. M. Stratton. New York: The Macmillan Company, 1923.

A very good essay showing the psychopathology of sadism in religion. The study was not intended to serve this purpose as it is written in a rather serious vein seeking a justification for sadistic trends in religion, but it may nevertheless be utilized, especially in connection with some of the hate mechanisms in epilepsy, dementia precox and religious mania.

MEDICOLITERARY NOTES

Dr. Taliaferro Clark and Dr. Edith B. Lowry, of the U. S. Public Health Service, are joint authors of an article in *Public Health Reports* for February 16th on Health Scoring for School Children, a Practicable Plan of Followup Work by the Child. In every department of education except health it has been found necessary to set a standard toward which the child can work. Following this line of thought, an attempt has been made to establish a health standard that can be lived up to by everyone, adult or child. The article describes such a standard that has been tried out in a few of the states with success.

* * *

In an article in the May issue of the *Atlantic Monthly,* entitled Experiences in Dying, Dr. J. D. MacKenzie tells of five personal experiences in four different countries which brought him to the verge of death. His conclusion is that death must be an "easy, gentle thing, a pleasant, sweet release."

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A recent number of *Public Health Reports* gives an interesting outline of the remarkable progress of public health activities in Jugoslavia since the close of the war. Among these activities have been the passage of new health laws, the provision of sections for health education for the sanitary districts of the country, which have held more than four thousand meetings and distributed literature and used films, the establishment of sixteen bacteriological stations for the study of infectious diseases, and of a special institute for the study of tropical diseases, a school for nurses has been greatly enlarged, a special study is being made of malaria, several Pasteur Institutes have been enlarged and their equipment increased to include other branches of medicine, a hospital for the study and treatment of trachoma has been opened, thirty tuberculosis dispensaries have been established, and pavilions for the treatment of venereal diseases have been greatly enlarged.

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The report of the New York State Veterinary College at Cornell University, covering the year 1921-1922, has recently been issued for distribution.

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The Antiquity of Disease, by Dr. R. L. Moodie, of the University of Illinois, is the latest volume of the University of Chicago Science Series, published by the University Press. The book is popular in treatment and is distinctly for the layman, but its subject matter and sound scientific basis make it of value also to the physician.

* * *

Two volumes of medical interest have just been published by Brentano's and the Century Company, respectively. They are *Right Food the Right Remedy,* by the well known dietitian,Charles C. Froude, and *Teeth, Diet, and Health,* by Dr. Kurt H. Thoma, assistant professor of oral histology and pathology in the Harvard Dental School. Both books are designed particularly for the general reader.

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The Woman's Medical Journal for February contains an outline of the proceedings of the Second International Congress for the Protection of Mothers and Infants, held in Paris last summer.

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The pupils of Freud in Vienna have founded recently two organizations, the Society for Applied Psychopathology and Psychology, and the Psychoanalytical Reunion. Vienna has had for some time a psychoanalytical dispensary where the poor are given analytical treatment, and where young physicians have the opportunity to learn psychoanalytical methods.

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The *World's Work* for May contains an article by Samuel Hopkins Adams on the new profession of health officer. The title is Doubling the Guards on Health.

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As a result of a gift from the Commonwealth Fund to the National Committee for Mental Hygiene, the Division on Prevention of Delinquency has a fund for fellowships in psychiatry. Those securing fellowships will be placed under training in the clinics now being conducted by the division. The object of the fund is to prepare properly qualified psychiatrists for positions in connection with permanent clinics that are now being organized through the activities of the demonstration clinics conducted by the National Committee for Mental Hygiene. The fellowships will be awarded by a committee composed of Dr. Thomas W. Salmon, Mr. Barry C. Smith, and Dr. Frankwood E. Williams. Those interested in securing information regarding the fellowships may address Dr. V. V. Anderson, Director of the Division on Prevention of Delinquency, the National Committee for Mental Hygiene.—*Mental Hygiene Bulletin.*

Practical Therapeutics

SPINAL ANESTHESIA IN RELATION TO ASSOCIATED THERAPEUTIC PROBLEMS*

By W. Wayne Babcock, M. D.,

Philadelphia.

In the physiological action of spinal anesthesia, the effect on the sympathetic system stands out as of great practical importance. With the interruption of conduction in the anterior and posterior nerve roots, and of the rami communicantes of the spinal segments that are acted upon by the drug, the predominant feature apart from the analgesia and the palsy is the great fall in blood pressure. A fall registered by twenty to thirty milligrams of mercury is moderate; thirty to fifty not unusual; and a fall in the systolic pressure in the radials to zero is occasionally seen. Several factors contribute to this vascular hypotension. The vascular relaxation from the paralysis of the vasomotor nerves is associated with a relaxation of the voluntary muscles, reducing the normal support to their contained veins. The abdominal walls also relax, and with the associated abolition of abdominal respiratory movements, the supporting pressure on the intraabdominal vessels is reduced. With most conditions producing a fall in blood pressure, there is an increase in the pulse rate, but in spinal anesthesia, anomalously, the heart beats slower as the pressure falls. A reduction in the heart rate from eighty or ninety to sixty, fifty or forty-five is uncommon. Being largely released from the stimulating sympathetic influence, the heart has the inhibitory action of the vagi practically unopposed. With the slower circulation, the cavities of the heart fill more slowly and, with the reduced stimulus from the lessened *vis à fronte,* the contractions of the heart become weaker so that the circulation is slowed not only by the widened blood paths but also by the slower, weaker cardiac contractions. There is produced by spinal anesthesia, therefore, a vascular system largely cut off from normal vasomotor impulse, a condition favorable for the determination of the stimulating power of drugs upon the peripheral vessels, locally upon the heart, and possibly also an added means for estimating the depressing action of drugs upon the pneumonogastrics. Spinal anesthesia is the curare of the vasomotor system.

In other words, one may effectively cut off by the intradural injection, all influences emanating from many segments of the spinal cord, for a limited period of time, and during this time may test the action of a variety of drugs upon the peripheral vessels and heart. Bound up in these experiments is the solution of the predominant danger of spinal anesthesia, for it is the fall in pressure and the second respiratory failure from ischemia of the centres in the medulla that have much to do with collapse from this anesthetic. The dangerous effects upon the upper cervical nerve roots can be largely avoided by the technic of the injection, but the fall in blood pressure is often the chief concern of the surgeon.

For eighteen years we have used spinal anesthesia in over sixty per cent. of our operative work, and have obtained impressions as to certain actions of a number of drugs used during the period of anesthesia. Some of these impressions have been confirmed by blood pressure and other studies; many are fragmentary and require confirmation. They are presented as elementary observations, with the hope of stimulating further investigations in this field.

DIGITALIS.

As would be expected, digitalis acts so slowly as to render it necessary to administer the drug hours or days before the induction of spinal anesthesia. Therefore, it is much more difficult to study its action than that of a rapidly acting vascular stimulant, and impressions must largely replace accurate records. It apparently has little action on the normal heart under spinal anesthesia, and while it does not prevent a marked fall in blood pressure, it seems to enable the weakened heart better to withstand such a fall. It seems, therefore, a valuable drug in the preanesthetic preparation of many cardiopaths.

ETHER.

Very light etherization, as by inhalation, seems to act as a definite stimulant, producing a slight increase in the blood pressure (two to twelve milligrams of mercury) and an improvement in the patient's condition during the stage of hypotension of spinal anesthesia. The second or third stage of etherization is probably unsafe, tending to increase the dangers of the anesthesia, and of course these stages are practically unnecessary during the period of relaxation of spinal anesthesia.

NITROUS OXIDE.

As with ether, a very light gas oxygen analgesia improves the condition of patients in spinal anesthesia, increasing the blood pressure five to twenty points. It is dangerous when pushed to a full or prolonged narcosis. In no case should sufficient nitrous oxide be given to cause cyanosis. In spinal anesthesia, cyanosis and the accumulation of carbon dioxide in the blood largely fail to improve circulatory hypotension.

AMMONIA.

Ammonia used in the form of the aromatic spirit, and administered by inhalation, has a slight stimulating effect. A rise in blood pressure of from six to twelve milligrams of mercury has repeatedly been observed from the inhalation.

STRYCHNINE AND CAFFEINE.

These drugs seem to have little effect in increasing blood pressure during spinal anesthesia.

PITUITRIN.

An extensive use of pituitrin, given subcutaneously or intramuscularly, has given us the impression that the drug has some value in maintaining blood pressure in spinal anesthesia. We have not been able to prove this definitely, however, and one c. c. of the surgical solution of pituitrin may be injected intravenously during the period of hypotension of spinal anesthesia with no influence upon the blood pressure. As a circulatory stimulant, in contrast with epinephrine, it seems to be a very weak and uncertain drug, and may be valueless in spinal anesthesia.

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*Read at the annual meeting of the American Therapeutic Society, May 1 and 2, 1922.

EPINEPHRINE.

Given intramuscularly or subcutaneously, ten minims of epinephrine produces a slight effect upon the blood pressure, while two to fifteen minims administered intravenously may produce a violent stimulating action, sending the blood pressure up thirty, forty to eighty points in two or three minutes. The effect is so sudden, and in some patients so violent, that the drug should be administered very cautiously and in dilute solution. Some robust patients will show overstimulation from one to three minims, while on the other hand debilitated or greatly depressed patients may require sixty or eighty minims of a one in a thousand solution to produce a moderate degree of stimulation. Practically, therefore, we inject the solution slowly until the circulation shows the first sign of improvement, when the injection is stopped, to be resumed if the pressure is not sufficiently elevated or maintained. The effect may pass off and be followed by undesirable secondary depression in twenty or thirty minutes, therefore for some patients it is desirable to tie a needle in the vein and use an intermittent injection of dilute solution to produce a sufficiently prolonged effect. In most cases, however, the hypotension of spinal anesthesia has largely passed by before the secondary reaction from the epinephrine occurs. It is probably the most powerful drug for raising blood pressure during spinal anesthesia. The effect is observed in the wound by the increased bleeding and the appearance of spouting vessels. Respiration usually improves after stimulation of the circulation, together with the color and warmth of the skin. If, from the hypotension, the heart has stopped beating, then large quantities of a solution containing epinephrine must be introduced into the vascular system, and rhythmic compression of the heart carried out to force out the old blood and to permit the epinephrine to enter the coronary vessels. The free introduction of very weak (1 to 60,000 to 1 to 100,000) epinephrine solution, in combination with procaine, for local anesthesia improves the condition of the circulation under spinal anesthesia, and therefore renders the operation of greater safety. Five hundred to two thousand c. c. of such a weak solution may be used with safety if the injection is not made into the blood stream.

For uniform effects in spinal anesthesia, it is necessary to observe the following technic:

1. The needle point must be free in the cavity of the arachnoid, and the cerebrospinal fluid must escape freely from the needle, otherwise the solution may be diverted from the nerve roots that it is desired to influence.

2. The specific gravity of the solution must be so adjusted with the position of the patient on the operating table that the proper nerve roots may be anesthetized. Owing to the usual marked fall in blood pressure, we prefer to inject a solution lighter than the cerebrospinal fluid, and to lower instantly the upper part of the body and continue the elevation of the pelvis until the drug has been fixed by the tissues and can no longer diffuse.

3. The concentration of the analgesic solution is important. The proper percentage strength varies with the different drugs employed. Some are much weaker than others, but in general the stronger the solution the more intense, the more diffuse, and the more prolonged the action.

4. The amount of cerebrospinal fluid withdrawn and the amount of fluid injected influences greatly the height and extent of the anesthesia. By withdrawing much cerebrospinal fluid, mixing it with the drug and reinjecting, high effects reaching the cervical roots or the cranial nerves may be produced. Likewise, the same amount of drug diluted by ten c. c. of liquid and injected will show a wider diffusion and higher anesthesia than when injected dissolved in but one c. c. of solution.

5. The force with which the injection is given influences greatly the diffusion and height of action in spinal anesthesia. A very forcible injection may cause untoward effects and death from the influence upon the cervical nerves, and the ensuing fall in blood pressure and paralysis of the diaphragm. An operator, therefore, who is not familiar with the influence of specific gravity, the position of the patient, the influence of drug concentration, and of bulk and force in making the injection, will have variable results, and may meet with disaster, whereas careful attention to these various details insures a remarkable uniformity influence of the drug, with the least danger.

2033 Walnut Street.

DIGITALIS IN THE TREATMENT OF TOBACCO AMBLYOPIA

Preliminary Contribution

By M. R. Dinkelspiel, M. D.,
Wilkes-Barre, Pa.,
Formerly Instructor in Ophthalmology, Medicochirurgical College, Philadelphia.

The rapid improvement in several cases of tobacco amblyopia, associated with the usual involvement of the papillomacular fibres of the optic nerve, and central scotomata for red and green, in which digitalis was exhibited, justifies further observations.

Notwithstanding the opportunity afforded by the ophthalmoscope for direct inspection of a portion of the circulation, our knowledge of the intraocular manifestations of cardiovascular disease is practically embraced by pulsation of the retinal vessels, retinal hemorrhages, thrombosis, embolism, and venous congestion in valvular heart disease, exophthalmos and mydriasis from irritation of the cervical sympathic in aortic aneurysm, or the reverse in its paralysis; and of course, characteristic changes in the fundus from arteriosclerosis. Probably for this reason, digitalis does not occupy the position in ophthalmic therapeutics that it should, although its properties for promoting local nutrition as a circulatory stimulant are well known, as evidenced in chronic valvular heart disease, followed by compensatory hypertrophy. Ophthalmic literature is quite barren on this subject, with the exception of an occasional mention of digitalis as a circulatory stimulant, a specific reference to its use in toxic amblyopia by de Schweinitz (1), as follows—"and the circulation of the optic nerve may be stimulated by, the exhibition of digitalis and nux vomica." Likewise Hare (2), and Hanke (3).

This scarcity of ocular manifestations, and the frequently enforced abstinence from tobacco in cardiac disease, has likewise limited the field for observation. On the other hand, the synchronous response of the retinal artery to the systole of the heart, and the ability to view arteries, veins, and capillaries during life, in situ, offer alluring opportunities for the intraocular observation of the action of cardiac drugs. Pioneers have already appeared in this fertile field, especially along the lines of ocular blood tension—R. H. Elliot (4), Gaudissart (5), etc. The occasional alternate increase and decrease in the red intensity of the central artery of the retina, and its branches on the disc, in cases presenting the prodromal symptoms of glaucoma, no doubt due to pressure from increased tension, show the importance of the cardiac systole as an intraocular manifestation. An additional indication for an increased determination of blood to the eye for its local nutritional value is indicated, by the fact, recently mentioned by Priestly Smith (6), that it is known that the blood stream fall in pressure as they pass through the eye, although not known how the fall is distributed.

Mydriatics sometimes increase venous pulsation in normal eyes, and the presence of a spontaneous pulse has been investigated in a very painstaking manner by Elliot, (4) abstracted as follows:

"In a very interesting discourse on the arterial and venous retinal pulses, with full consideration of the anatomical and physiological factors that enter into their causation, a graphic chart is presented to explain every step in the progress of such pulsations marked off in tenths of a second. Then follows a statistical study of the venous pulse in a hundred healthy individuals; these persons came under observation for refractive conditions but were free from any signs of disease and those who were even intractable or nervous were excluded. Considering them as individuals, a spontaneous pulse was present in both eyes in forty-six per cent.; absent in both in forty per cent.; present in one eye only, in fourteen per cent. Of the first group, the pulse was even in both eyes in twenty-eight per cent.; uneven in the two eyes, in eighteen per cent. Of the group in which pulsation was absent, it could be elicited by pressure in both eyes in twelve per cent.; in one eye only eighteen per cent.; no pulse even on pressure, in twenty per cent. Dealing with the two hundred eyes, regardless of the patients they belonged to: Spontaneous pulse was present in forty-nine per cent.; absent in fifty-one per cent. Of the first group, pressure increased the pulse in 35.5 per cent.; stopped or diminished it in seven per cent.; had no influence in two per cent.; escaped notice in 4.5 per cent."

In toxic amblyopia due to tobacco, digitalis is only of value before the establishment of organic changes, but in the stage so often characterized by slight haziness and hyperemia of that portion of disc corresponding to the distribution of the papillomacular bundle of fibres, its action is often rapid, and enhances the value of strychnine or nux vomica, to a remarkable degree. Nux vomica admits of better control and dosing in the individual case than strychnine, with the exception of those cases in which there is no time for more prolonged observation. Gradually increasing doses of a good tincture of nux vomica, up to thirty or forty minims three times a day, if tolerated, combined with eight to ten drops of a potent digitalis preparation such as digalen, have in the main, given better results at my hands, than even the hypodermic administration of strychnine. The benefit of digitalis in toxic amblyopia from local blood nutrition, may eventually establish either the theory of Birch-Hirschfeld of a selective toxic action on the ganglion cells and axis cylinders; or that of Schieck of beginning bloodvessel changes; and there is also a diuretic action of digitalis, which, in the absence of further knowledge in these cases, although as yet negligible, cannot be overlooked.

Furthermore, in support of the value of digitalis in promoting optic nerve nutrition, there is hardly a disease due to infection in which the optic nerve is not sometimes involved. To this may be added those cases due to disturbances of metabolism, and those occurring during lactation, menstruation, pregnancy, and the puerperium.

It is generally conceded that in so important a drug as digitalis, varying in strength and physiological potency, a standardized preparation should be used. There are several of them to be had, my preference having been for digalen, reasons for which were pointed out in an article by me (7), and substantiated by fifteen years more of clinical experience. The dose, in cases of tobacco amblyopia, most successful at my hands, has been five to ten minims twice or three times daily, in addition to increasing doses of a physiologically standardized tincture of nux vomica, in increasing doses to the point of tolerance. Digitalis obviously should not be employed where systemic contraindications are present; and where atrophic changes are established, it is of doubtful value, and while it has no specific or selective value in these cases *per se*, it is a very valuable adjunct. I have had no experience with the use of phosphorus in the form of injections, recently advocated by Terson (8).

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1. De Schweinitz: *Diseases of the Eye*, 1916.
2. Hare: *Practical Therapeutics.*
3. Hanke: *The Treatment of Diseases of the Eye*, London, 1905.
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5. Gaudissart: *American Journal Ophthal.*, July, 1921.
6. Smith, Priestly: *British Journal Ophthal.*, September, 1921.
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Early Signs of Rickets.—J. H. Thurshfield (*Lancet*, September 9, 1922) states that the presence of bone deformities in a rachitic child is an indication of delinquency on the part of the attending physician; such changes ought never to be allowed to appear. He lays great emphasis upon what he calls the early signs of rickets: 1, Head sweating and restless sleep; 2, loss of muscle tone; 3, polyuria; 4, pallor; and, 5, alteration in the bones of the skull. In the presence of any of these five symptoms, rickets should be suspected and the diet and hygienic conditions surrounding the infant should be investigated and the known factors of rachitis should be eliminated. No other disease responds so readily to appropriate treatment.

Proceedings of Societies

NEW YORK ACADEMY OF MEDICINE

SECTION IN GENITOURINARY SURGERY.

Meeting Held on March 15, 1922

DR. ABRAHAM HYMAN in the Chair.

Presentation of Case Reports (a) Steinach's Operation; (b) Two Cases of Gonorrheal Arthritis Treated by Nonspecific Proteins and Local Treatment.—Dr. LEO L. MICHEL presented these case reports. The former was that of a man who reported to the Hospital for Joint Diseases because of a severe, persistent pain in the lumbar portion of the spine. History and examination revealed a condition of marked neurasthenia and sexual impotence. Although numerous spermatozoa were found in the seminal fluid, they were immobile and apparently lifeless. The patient had already had treatment by electricity, mental stimulation, glandular extracts, etc., yet similar treatment was tried again at the hospital, but with no result. So a Steinach operation was performed at the hospital. Improvement was evident within six weeks after this operation. The backache had disappeared completely, there was no mental dejection, appetite was regained, the man became again sexually potent, and once more was able to attend to his work. The two cases of gonorrheal arthritis presented by Dr. Michel both received successful treatment, locally and intravenously, by injections of paratyphoid vaccine. The first was a typical case of chronic arthritis of the feet of gonorrheal origin which had been previously diagnosed as inflammatory rheumatism. After treating the focal infection locally for about two weeks without effect, injections of vaccine were added, beginning with fifty million, and repeating every four days, with the result that, with the sixth injection, all the joints were under control. The second case was one of acute arthritis of the shoulder and knee. Four injections were given, although the symptoms seemed to have been controlled after the second. Although the patient was discharged as well, he was still unable to have free use of his arm because of muscular atony.

Treatment of Acute Gonorrheal Urethritis With Acriflavine.—Dr. HOWARD S. JECK, who read this paper, stated that acriflavine was selected by Davis and Harrel as an ideal preparation for treating gonorrhea because of its marked penetrating properties, its nontoxicity within reasonable limits, and its definite germicidal properties in weak dilutions. Results from the use of acriflavine in treating gonorrhea, however, were not so remarkable as was hoped would be the case. Yet it seemed to produce better and quicker results than any other one remedy. The method of injecting the acriflavine, together with the quantity of saline injected, was of first importance in its successful use. Very small amounts should be slowly injected, rather than a quantity sufficient to cause overdistention, or even a small amount injected too rapidly. The latter seemed to produce harmful spasm of the urethra. A single daily anterior injection of one in five thousand solution retained for one half to one minute was sufficient to carry a case from the acute to the declining stage in a comparatively short time. Dr. Jeck said that in his experience cases treated with acriflavine alone ran a definitely shorter course than cases treated with other injections alone; and cases treated with acriflavine alone ran a shorter course than cases treated with acriflavine plus other injections.

Treatment of Acute Gonorrhea in Its Declining Stage.—This paper was read by invitation by Dr. HERBERT MOHAN; the first point discussed was the great difference between the time needed to bring the infection under control, and that given to its eradication. The paper dealt only with the long period of the declining stage. Little profit could be expected from the urethral use of any of the known disinfectants, but a better response was to be met with from mechanical measures, particularly the sound, and this instrument had, indeed, proved invaluable. Perhaps the tradition that instruments and gonococci do not go well together had accounted for the prejudice against its use. Experiments in passing the sound by very small degrees earlier and earlier in the course of the cure were made and resulted after a long while in the conclusion that the sound carefully passed did not result in a too troublesome exacerbation of the gonorrhea. Unfortunately, the cases so treated were not numerous enough to be imposing, and it might be argued that there was no way of proving that these patients might have been cured in the same length of time, had the sound not been used.

No untoward effect of this procedure was noticed, except a slight increase in the amount of discharge for about twenty-four hours, with a corresponding increase in the amount of pus in the urine. Improvement generally followed twenty-four or forty-eight hours after the passing of the first sound, which, in the cases under discussion, was never larger than a 22 F, and perhaps should have been smaller. Better results were obtained the earlier the sound was used, provided always the gonococcus had been first subdued. The day for mechanical interference could be set, not by time, but by clinical appearances. The usual time was four or five days, the patient having received daily injections or irrigations in the meantime. The earliest case of all those treated was of two days' duration. The first sound was passed on the third day, again on the sixth, and the patient was discharged on the thirteenth day. When seen four months later, he was still well. The greatest gain seemed to be obtained by passing the first sound when the urine was still hazy with pus. Increased rate of improvement was often negligible or absent if it was delayed until the urine was clear but shreddy. The most encouraging cases were those who most needed encouragement—patients of a long standing condition, whom every treatment seemed to help, but none to cure. Three such cases, with a constant discharge in spite of steady treatment, were noticeably helped at their first visit by the passage of a sound and an injection of acriflavine.

In treating posterior infections also, it appeared valuable to interfere while the lesions were still fresh and tender, and before they had settled down into chronicity. The first sound was passed, or the second or third, if necessary, only as far as the penoscrotal angle or bulb, the daily anterior injection was changed to a daily wash of the whole urethra for a day or two more, then the first sound was passed all the way. No disaster followed this instrumentation of the infected posterior urethra. In fact, the forced irrigation was regarded with a good deal more concern than was the sound, and for this reason a gentle method of carrying it out was adopted. In all cases it was done with a large plungerless syringe, the bulb of which was thin walled and soft. It was found better to irrigate before the sound than after, because the sound might bruise a lesion with the result that the fluid would be painful and bring about a spasm of the muscle.

The milder posterior cases progressed in the same manner as those with anterior infections. In all, only fifty-one cases were studied, and thirty-five had no interest for this paper, as there were no results, probably because the sound was withheld too long. The other sixteen showed at least a decided shortening of their courses as compared with earlier cases.

Treatment of Chronic Urethritis.—Dr. Edward L. Keyes, who read this paper, dwelt chiefly upon the importance of sexual hygiene in the treatment of prostatic inflammation, and emphasized the value of the use of the sound rather than that of the dilator for the cure of the most superficial lesions of chronic urethritis, both anterior and posterior.

Discussion.—Dr. Bierhoff said that in treating gonorrhea the first aim of the physician was to discover the gonococcus as soon as possible and destroy it. It made little difference what drug was used, so that it was not an astringent. When the acute stage had disappeared, the infection might remain; it was then the duty of the physician to locate the focus of this infection—to the urologist the two important sites were the anterior and the posterior urethra. Only after the gonococcus had been destroyed was it proper to use the sound. This should never be used if involvement of the prostate was suspected. It cases of chronic gonorrheal involvement of the urethra, it was a dangerous instrument and the dilator should be used instead. Neither instrument, he said, need be brutal in the hands of the right physician.

Dr. Lewis H. Marks reviewed in an interesting manner the theoretical foundation upon which Prof. Paul Ehrlich built up the preparation of acriflavine, which he discovered in his laboratory in Frankfurt during his investigations of African sleeping sickness.

Dr. Hardy reported on some work done by him at the City Hospital in treating gonorrheal arthritis and other infections with acriflavine, and stated that his conclusions agreed in the main with those of Dr. Michel.

Dr. Barringer said that he had been using this drug for about three years, and had found that about eight out of ten cases, if treated within the first four days after the appearance of the discharge, were helped. He asked if Dr. Jeck could throw some light on the patients that did not react promptly. The acriflavine seemed to irritate some, and not to clear up the urine, but to make it more purulent.

Dr. Morton stated that he had used acriflavine treatment in about twenty-five cases, and, from results received, was led to believe that it was perhaps the best method treatment yet in vogue. In the majority of cases, the results might be described as brilliant, conditions clearing up entirely in three weeks.

Dr. Ware took issue with Dr. Keyes on certain points in the discussion of acriflavine, and also gave some of his views on instrumentation.

Dr. L. T. Mann reported six cases treated with acriflavine by mouth, but the treatment was discontinued as productive of harmful results.

Dr. Aschner said that he was a follower of Bierhoff's method and used one half per cent. to one per cent protargol, ordering it every three or four hours. With this he had got results that he had been unable to equal with acriflavine. In cases of secondary infections he had had greater success with mercurochrome than with any other drug.

Dr. Asch emphasized the importance of exterminating the gonococcus as long as any trace remained, and Dr. J. J. Valentine spoke of his experience with the acriflavine treatment in France, and asked if there were any explanation of the varying results obtained from this treatment. Dr. Kaliski said that in his experience acriflavine should be regarded as "another" good remedy to be used in acute gonorrhea, but that it was not a cure at all. In some cases, especially early and first infections, it had little or no deterrent affect on the progress of the disease, and other remedies were to be substituted. Dr. Hyman stated that he also had found that in primary or first infections, acriflavine had not very satisfactory results, and that there were numerous recurrences. The good results were seen in those cases that had had previous infections. Whether this was due to the drug, or to the pathological changes in the urethra as a result of gonorrhea, could not be determined. He added that in cases in which the gonococcus was resistant to treatment, by irrigation, he had used the method described by Dr. Mohan, except that he had employed the dilator instead of the sound, and had had excellent results.

Meeting Held on April 19, 1922.

Dr. Abraham Hyman in the Chair.

A Presentation of Patients, Specimens, and Case Reports: (a) Demonstration of Desiccation, Coagulation, and Carbonization Tests with Soap, of the Oudin Current, by Dr. Victor C. Pedersen; (b) Hypernephroma of Kidney: Removal with Perirenal Fat en Masse, by Dr. A. Raymond Stevens; (c) 1. Papillary Carcinoma of Kidney: an Early Case; 2. Hydropyonephrosis Due to Calculus, Complicated by Resulting Fecal Fistula, by Dr. J. Sturdevant Read, by invitation.

Dr. Barney congratulated Dr. Read on being able to present such a specimen of renal calculus; he said that examination of recent literature showed that there was no example of renal fistula into the pleural cavity, the intestines, nor the stomach, whereas in former years there were quite a large number, showing that the diagnosis was now made sooner than it was twenty years ago. Such cases were almost unique nowadays.

Dr. Guy Hunner, of Baltimore, spoke, in connection with Dr. Stevens's case, of the bad prognosis in the ordinary case of hypernephroma, and the difficulty of early diagnosis.

Dr. Beer, referring to Dr. Pedersen's demonstration, said he had been greatly interested in trying to devise methods of more satisfactorily employing the D'Arsonval and Oudin currents; what had been bothering him most was the construction of an electrode that would render it possible to grasp the tumor, lift it, and then turn on the D'Arsonval current. He expressed the hope that some one would be ingenious enough to work out some such electrode.

Dr. Lowsley described a case of his own, a man who had had a large stone in the lower part of the right ureter. The man had seemed to be entirely well until within the two preceding weeks. A pyelogram disclosed the condition beautifully, and the distortions of the ureter were very distinct.

Dr. Aschner outlined one case he had seen of penetration of the bladder by the Oudin current. In reference to Dr. Read's case of pelvic neoplasm, he believed that primary complete nephrectomy was indicated.

Dr. Pedersen outlined two interesting cases of hypernephroma and requested opinions on the virulence of the disease. Dr. Beer raised the question as to whether the renal fat should be removed in all cases of kidney tumor. Dr. Hyman, replying to Dr. Pedersen, stated that at times it was impossible to prognosticate the course of hypernephroma, although it might be said that in general the prognosis was bad. A few cases had survived the operation two or three years and then died of metastases. Few patients surviving three years had at the time of the operation extension of the growth into the renal veins. Dr. Pedersen then discussed the D'Arsonval and Oudin currents, stating that the reason why the former was so much better than the latter was because the D'Arsonval, being a bipolar current, could be more fully controlled as to voltage, amperage, and heating qualities. This subject was followed by the discussion by several of those present of the arguments for and against the removal of perirenal fat.

The Question of Recurrent Calculi.—This very interesting paper was read by Dr. J. Dellinger Barney. He declared that there was an unfortunate paucity of investigation on the subject of recurrent or overlooked renal calculi, and that it would be desirable for various observers in different clinics to undertake such an investigation. Radiographic examination during or very shortly after convalescence was essential to the accuracy of the results in such a piece of work.

While the few data at hand showed that stones were subsequently found in the kidney after operation in a surprising number of instances, it was impossible to say which of these stones were "recurrences" and which "left overs." Actual recurrence was unquestionably very frequent.

The complex character of the interior of the kidney, hemorrhage from its mucosa, and the comparative inaccessibility of this organ in many cases contributed to the difficulties of removing all stones. Although various procedures might be resorted to for this purpose, none were infallible. It would appear that the fluoroscope offered the most promising prospects of success.

Preoperative study could not be too painstaking, nor must the possibility of superimposed shadows of calculi be overlooked. A second operation for the removal of remaining stones was advisable in most cases, and should be done soon after the first operation. Pyelotomy was unquestionably the operation of choice, and was often advantageously combined with partial nephrotomy.

Dr. Hunner said he hesitated to bring up his hobby of ureteral stricture after such a paper as Dr. Barney's, but his experience with this had been most illuminating on this subject of stone formation in both ureter and kidney—there seemed to be hardly any doubt that the majority of ureteral stones formed in the stricture area. Another important fact was that the stricture is so often multiple.

The discussion was continued by Dr. Beer, Dr. Rathbun, Dr. Pedersen, and Dr. Aschner, and closed by Dr. Barney.

Treatment of Metasyphilis According to the Method of Gennerich.—Theodor Brunner (*Schweizerische medizinische Wochenschrift,* August 17, 1922) reports on the effects of the following course of treatment; general treatment with uniform courses of eight to twelve injections of salvarsan given intravenously at intervals of five to seven days, with doses of 3 to 4.5 gram of sodium salvarsan at periods of 2.5 to 3.5 months. During this course of treatment, a course of iodine is given for six to eight weeks. During the intervals, a dose of three grams of sodium salvarsan is given intravenously every two to three weeks and also a course at Karlsbad for six weeks, in addition to the administration of abundant fluids. The intraspinal treatment with neosalvarsan is given at intervals of two to three weeks or, at the most, four weeks. Aside from occasional fever, vomiting and transient attacks of pain, there were no disturbances and the results were clinically striking in every case; parallel with the clinical improvement, there was a progressive diminution in the spinal fluid values, a regression of the Wassermann reaction and of the albumin values and also of the pleocytosis.

Clinically, the treatment resulted in a diminution of the severe cerebral disorders, a diminution of the psychomotor excitement, a return of memory and orientation and a disappearance of the disturbances of speech and chirography; there were also a retrogression of tabetic symptoms and a general all around improvement; parallel with the clinical improvement, there was also evident an improvement in the pathological spinal fluid in the sense of a retrogression of the high Wassermann, albumin and lymphocyte values. In a certain percentage of the cases, improvements and even cures are accomplished. The early cases, namely the demented cases, are more suitable for this treatment than the agitated cases. If no improvement occurs after the third or fourth intraspinal treatment combined with the intravenous treatment, the entire treatment should be discontinued.

Abstracts from Current Literature

GENITOURINARY DISORDERS.

Recurrent Renal Calculi.—J. D. Barney (*Surgery, Gynecology, and Obstetrics,* December, 1922) asserts that there is an unfortunate paucity of investigation in the matter of recurrent or overlooked renal calculi and it would be desirable to have various observers in different clinics undertake such an investigation. Röntgenographic examination during or very shortly after convalescence is essential for the accuracy of the results in such a piece of work. While the few data which are at hand show that stones are subsequently found in the kidney after operation in a surprising number of instances, it is impossible to say which of these stones are recurrences and which are left overs. Actual recurrence is unquestionably very frequent. The complex character of the interior of the kidney, hemorrhage from its mucosa, and the comparative inaccessibility of this organ in many cases contribute to the difficulties in removing all stones. Although various procedures may be resorted to for this purpose, none is infallible. It would appear that the fluoroscope offers the most promising prospects for success. Preoperative study cannot be too painstaking, nor must the possibility of superimposed shadows of calculi be overlooked. A second operation for the removal of remaining stones is advisable in most cases and should be done soon after first operation. Pyelotomy is unquestionably the operation of choice and is often advantageously combined with partial nephrotomy.

Chronic Prostatitis in Men with Bladder Fistulæ.—Henrik Alapy (*Gyógyászat* (Medicine), July 10, 1921) says that, as outlined by Alapy eight years ago, epicystotomy is indicated in the second or third stage of prostatitis with accompanying cystitis which is not relieved by catheterization, and where prostatectomy cannot be performed because of involvement of the kidneys or other organs. The relief afforded by the fistula is only temporary in some cases, as a troublesome complication develops later, which is characterized by pain recurring in three to four months or even in a few weeks. Pain due to an inflamed cord or epididymitis, as well as all observable complications, are excluded from the picture. Pain is of an increasing character in cases with open drainage tubes (Pezzer's catheter). Severe pain is also prone to develop in cases with closed catheter at the time of opening it for the purpose of urination, the pain lasting at times for fifteen minutes. The intervals between urination become shorter with the pain growing in intensity. The same pain is complained of during defecation or passage of gas.

The diagnosis of this pain should not be confused with pyelonephritis, which is notably improved by continuous drainage. Cancer can also be eliminated. Examination of excised prostate glands showed a chronic inflammatory condition around the inner capsule. The capsule is extensively infiltrated with mononucleated or multinucleated round cells, the infiltrations following vessel and glandular tracts. These chronic inflammatory changes are found only in glands with old bladder fistulæ and always in the tissue connecting the adenoma with the inner capsule. The relief from pain following prostatectomy is astonishing. The reason for the localization of the inflammatory process in the tissue layer between adenoma and inner capsule, the hypersensibility of the bladder lining, as well as the astonishing relief from pain following prostatectomy, are questions, still unanswered, which require further investigation.

Transplant of Ureters.—Robert C. Coffey (*Surgery, Gynecology and Obstetrics,* May, 1921) gives the following conclusions in transplantation of the ureters into the large intestine in the absence of a functionating urinary bladder:

Transplantation of the ureter into the large intestine is the most essential procedure in operations requiring removal of the urinary bladder.

The principal force to be dealt with in implantation of a duct into the intestine is static intraintestinal pressure. The influence of static intraintestinal pressure in dilating an unprotected duct mouth was first mentioned and described before the Southern Surgical Association meeting, at Hot Springs, Va., in 1909, and before the American Medical Association meeting, at St. Louis, in 1910. Submucous implantation of the duct, for the purpose of reversing the force of static intraintestinal pressure and bringing it to bear on the side of the duct, was demonstrated in the same presentation, including the technique of the operation.

The essential mechanical principle necessary to the uniformly successful implantation of the ureter is that the ureter shall be made to run immediately under the loose mucous membrane for a distance, before entering the lumen of the intestine.

Renal Functional Tests and Their Value in Urological Medicine and Surgery.—Leo Buerger (*Medical Clinics of North America,* November, 1922) shows that the phenolsulphonephthalein test is of secondary importance in functional diagnosis because a low phenolsulphonephthalein output merely indicates the inability of the kidneys to excrete the dye at any given moment, and because it yields no information as to what the kidneys could be made to do, or whether the patient is not in a state of good functional equilibrium; renal deficiency may be present, even in the presence of a normal phenolsulphonephthalein test. With a very small dye output (zero to ten or fifteen per cent.) the associated blood chemistry and either the Ambard or the accommodative test should also be used. With a zero phenolsulphonephthalein and high blood values, the patient is in danger, but it is only when, in addition, the Ambard coefficient is high or the concentrating power is lost and the tests for accommodative activity are defective, that the patient is inoperable. When the blood chemistry is repeatedly normal with a minimal output of phenolsulphonephthalein, the Ambard coefficient or the test for concentrative power is an additional safeguard. Very high urea, total nitrogen, creatinin and uric acid values are positive evidence of renal inadequacy. Very high uric acid and creatinin values always suggest the presence of chronic nephritis upon which a surgical lesion may be engrafted or an acute nephritis superseding the surgical lesion. In fact, none of the tests can be accepted at their face value unless they are checked up and confirmed by the other important methods of testing.

In urological surgery, the phenolsulphonephthalein test may be used: 1, for a rapid determination of the combined total function of both kidneys, for the rapid differentiation between two kidneys and for the recognition of the diseased kidney; 2, for the determination of the blood values in the diagnosis of chronic nephritis for the estimation of the severity of the prognosis and for the determination of the retention of waste products; 3, the Ambard coefficient or MacLean index should be used as a valuable adjunct to both the phenolsulphonephthalein test and the blood chemistry; and 4, one of the two hour tests, that is, tests for the accommodative or concentrating power of the kidneys, either the Schlayer-Hedinger, the two hour renal test and the Mosenthal modification of the Strauss test. In most cases, where the blood chemistry is repeatedly normal, the phenolsulphonephthalein test normal and nephritis absent, the urea being adequate and the specific gravity normal or near normal, a nephrectomy may be done without recourse to the other tests. But in bilateral renal disease, the haphazard acceptance of an occasional phenolsulphonephthalein test and an occasional estimation of urea nitrogen, total nitrogen, creatinin and uric acid may not suffice and may even be misleading. Urologists with limited experience should also make use of the Ambard coefficient or the MacLean index, supplemented by tests for concentrative power and accommodative response as an additional safeguard.

Bladder Neck Obstruction.—W. B. Parker (*Surgery, Gynecology and Obstetrics,* January, 1923) gives the following summary:

1. That due to recent research on living patients with definite clinical entities of bladder neck obstructions, and not upon necropsies of those with advanced types of obstruction; more attention to diagnosis and relief forces a conclusion that posterior median bars exclusive of the Albarran type of hypertrophy are not so common as generally believed, and that a widely contracted bladder neck will be found a most common cause in the fourth and fifth decades for progressive vesical irritability and retention, that the causative influences are often not only local infections, but remote foci and systematic toxemias.

2. That the method of choice for classical contractures of the bladder neck of all types requiring major relief are best approached by the MacGowan modification of Young's technic, either suprapubically or through external urethrotomy incisions, for the educated finger is far superior to poor light illumination and to the same touch through an instrument intraurethrally in determining the removing of scar tissue to the level of resilient muscle, so that one may know the floor of the bladder again to be level with the floor of the urethra. Further, the operator may rest assured that the greatest of all dangers following this type of surgery—hemorrhage—is easily prevented and controlled.

3. That the modified Young punch or median bar excisor is to date the most efficient and safe instrument that is not limited in its field, for surgical relief of the bladder neck, associated with prostatic atrophy, prostatic hyperplasia, vesical calculi, or hypertrophied trigone.

4. That it is a most valuable aid, preceding, during, and following prostatic enucleation for incising the bladder neck and trigonal shelf, removing capsular tags, and small portions of prostatic tissue that are difficult of immobilization.

5. That a more satisfactory explanation is yet to be advanced as to bladder neck tone and the etiology of irritability, hypertension, spasm, and tenesmus, in reference to the production of contractures of the mechanical type.

6. That the mortality rate has been nil, that hemorrhage, although all former precautions were employed, has not occurred in bladder neck obstruction relieved by use of the modified Young punch; that postoperative absorption is less, and convalescence is shortened. Epididymitis in males past the procreative age is prevented by vasectomy. Last, but not least, the preparation of the patient for any type of major bladder neck surgery is of the utmost importance.

Diagnosis and Treatment of Ureteral Calculi.—Kenneth M. Walker (*Clinical Journal,* August 30, 1922) says that when the radiogram shows a calculus no larger than a large orange pip, and the kidney reveals no evidence of sepsis or back pressure, expectant treatment should be advised. The patient should be encouraged to drink copiously of bland liquids, to take plenty of exercise, and to await the passage of the stone by the ordinary channel. Fresh radiograms should be taken at monthly intervals and a record thus kept of the progress of the stone. If no alteration is noted in the position of the stone at the end of six months, more energetic treatment is needed; if it has moved, patience should still be exercised. The first of the energetic methods to be used is the dilatation of the ureter below the calculus by means of the passage of a ureteral catheter or bougie. If the catheter can be passed beyond the calculus, the prospect of success by such a method is excellent, but even when the tip of the catheter sticks at the level of the calculus, success is by no means out of the question. A catheter in the ureter acts in the same way as a catheter tied into the urethra. It produces muscular relaxation and dilatation of the canal. This dilatation is often sufficient to allow of upward passage of the calculus. When withdrawing the catheter the friction between it and the calculus is often sufficient to drag the latter a certain distance down the ureter. In order to achieve success the process may have to be repeated on several occasions, but as long as progress is made the method should be persevered with.

An additional help to the progress of the stone is lent by injecting a lubricating material, such as sterilized olive oil, into the urethra below the level of the stone at the moment of withdrawal. A two per cent. solution of papaverine sulphate, which has the property of relaxing the unstriped muscle fibres, may be injected into the ureter before removing the catheter. It must be admitted that a certain danger exists in leaving the catheter in the ureter longer than a few hours, and, especially when sepsis is already present, it is wise to inject a little saline through the catheter before removing it.

When the progress of the calculus into the bladder is prevented by the narrowness of the ureteral orifice, the latter must be enlarged, either by dilatation or incision. This is carried out through an operating cystoscope. Dilatation may be effected by means of suitable forceps, or else by employing a laminaria tent. This is placed in position within the ureteral orifice by means of a somewhat ingenious artifice. The end of an ordinary ureteral catheter is cut off, and the central wire made to protrude half an inch. On this is threaded a fine laminaria tent of a calibre equal to that of the catheter. Thus mounted and forming a tip to the catheter the laminaria tent may be inserted into the ureteral opening. It is set free by simply withdrawing the wire obturator of the catheter, and is left in the ureteral orifice until dilatation has occurred. At the end of three or four hours the tent is removed by means of a thread attached to its lower extremity, and passing out through the urethra. When these methods have failed or there is evidence of sepsis or back pressure, an open operation is indicated.

A Simple Reaction for the Demonstration of Infected Urinary Passages.—Oskar Weltmann (*Wiener klinische Wochenschrift,* August 10, 1922) checked up the results of the Griess test and reports that positive reactions in freshly passed urine are a reliable sign of infection of the urinary tract. This is a simple test for bacterial activity in the urinary tract, as nitrites are not formed in the urine except from bacterial activity. In the Griess test (Ylosvary modification), a half gram of sulphanilic acid is dissolved in 150 c. c. of dilute acetic acid (solution I); 0.2 gm. of solid a-naphthylamin is heated in 20 c. c. of distilled water and the colorless solution poured off from the blue residue is mixed with 150 c. c. of dilute acetic acid (solution II). The two solutions are mixed to form the reagent, which is kept in a bottle with a tightly fitting glass stopper. The cherry red discoloration shows a positive reaction.

Diastase Reaction of the Urine.—Arthur F. Sladden (*Lancet,* July 8, 1922) advocates an improvement in the Wohlgemuth technic, emphasizing the fact that the hydrogen ion concentration (pH) is not a negligible factor in the technic, especially when measuring quantities of diastase at the lower levels, as in cases of renal insufficiency. Pyelitis and pyelonephritis of definite bacterial etiology have no effect on the diastase output. If such a nephritis shows a progressively decreasing diastase content, the indication is serious; the increase of diastase in the convalescent stage of acute nephritis is strikingly in accord with the clinical improvement. In inflammatory conditions of the pancreas, a high diastatic value is the rule, and in the presence of a low diastase excretion tumor or atrophy rather than inflammation should be suspected. Many diabetics show a definite increase in total diastase units excreted in twenty-four hours. This test is most valuable in the differentiation of toxemia of pregnancy from pyelitis or nephritis in pregnancy: a sharp fall in the number of diastase units after two days is an indication for evacuation of the uterus. The urine tested should have a standard hydrogen ion concentration, preferably pH 6.7. The total day's excretion, rather than the unit value alone, should be considered.

Treatment of Ulcer of Bladder. — H. L. Kretschmer (*Surgery, Gynecology, and Obstetrics,* December, 1922) contends that the consensus of opinion among urologists is that this is a surgical condition and that once the diagnosis is made, nothing short of an operation will suffice. Indeed, it is the last choice as far as our therapeutic agents are concerned, since the majority of these patients have had all sorts of local treatment, the only result of which seems to be an aggravation of symptoms. Wide resection of the ulcer bearing area is the only treatment that has been carried out in this series with the exception of two cases which were treated by fulguration. In one case fulguration had been instituted elsewhere, and although most authors condemn this form of treatment, yet the result in this case (perhaps temporary) was rather striking, as brief résumé of patient's history shows. Of the eight patients operated upon, one had a relapse and another had pus and staphylococci in the urine. The remaining patients consider themselves well; that is, they are free of symptoms. Two patients were treated by fulguration with an immediate relief of symptoms. Time only will tell whether this will be permanent. Of the remaining four patients, two are no longer under observation and the other two have shown an improvement in their condition, this without any treatment. However, these two cases are not entirely free of symptoms.

Stalagmometric Investigations on Urines.—Kj. v. Oettingen (*Zentralblatt für Gynäkologie,* July 15, 1922) states that stalagmometry, which is the determination of the surface tension by the number and size of the drops, when the urine flows out of a fine cannula with the Traube apparatus, may be used as an adjunct to clinical diagnostic analysis. The urine is acidified previous to the determination and the resulting acidity quotient of the urine is found to be increased in pregnancy, infectious diseases, and malignant tumors. The most significant finding is the increase of the acidity quotient in the early diagnosis of pregnancy. The substances which lead to the changes in the surface tension are designated as stalagmones—the catabolic products of albumin bodies. The diseases with a diminished surface tension in the urine show conditions in which an increased cellular destruction occurs and there is an extensive parallelism between the acidity quotient in the urine and the changes in the blood, recognizable by the accelerated sedimentation of the red blood cells or by an increase of the lability of the plasma.

Tying off the Ureter.—Fritz Bierende (*Zentralblatt für Gynäkologie,* July 15, 1922) reports a case of partial atresia of the vagina with partial hematocolpos, hematometra and hematosalpinx. During the course of the laparatomy, the right ureter was divided at its upper portion. Inasmuch as an implantation of the ureter into the bladder was impossible, the ureter was dissected free at its upper part and two ligatures were superimposed on each other at the stump and another ligature was applied below. The ureteral stump was buried at the upper part of the wound. Recovery followed. Experimental ligation of the ureter has been found to result in dilatation of the renal pelvis and more or less marked hydronephrosis with secondary and gradual atrophy of the renal tissue and its replacement by connective tissue, so that the final result is the formation of a hydronephrotic sac with a thinned out atrophic wall. In the case reported there was also a severe infection of the hydronephrotic sac. This infection does not always occur.

The Mechanism of the Elimination of Phenolsulphonephthalein by the Kidney—A Proof of Secretion by the Convoluted Tubules.—E. K. Marshall, Jr., and J. L. Vickers (*Bulletin of the Johns Hopkins Hospital,* January, 1923) report experiments on dogs which lead them to the conclusion that the elimination of phenolsulphonephthalein by the kidney cannot be explained entirely on a filtration and reabsorption theory, but that the addition of a process of secretion of the substance by the convoluted tubules is necessary.

Obstruction of the Ureter.—C. A. Hill (*International Journal of Surgery,* December, 1922), in considering obstruction of the ureter as a frequent predisposing cause of localization of bacteria in the pelvis of the kidney, concludes as follows: 1. Obstruction of the ureter without infection, but with lowered resistance, is more often present than has generally been surmised. 2. This condition is a predisposing cause of pyelitis and pyelonephritis. 3. Certain organisms, as the colon bacillus, have a predilection for the upper urinary tract. 4. Routine urine culture is a valuable addition to the diagnostic armamentarium of the surgeon. 5. Early recognition and treatment of obstruction is highly desirable, for the long standing cases are often incurable with measures in use at present. 6. Every gynecologist should be thoroughly familiar with the cystoscope for diagnosis and treatment or, at least, should be able to provide facilities for its use.

DISEASES OF THE EAR.

Acute Suppuration of the Middle Ear: Early Drainage of the Mastoid Region—Being dissatisfied with the results from mere paracentesis and instillations into the external ear, Dan McKenzie (*Lancet,* June 17, 1922) tried the effect of early drainage of the antrum with satisfactory results in cases in which the acute symptoms disappear after the onset of the discharge, but the discharge persists in spite of meatal treatment. Until the discharge ceases, the patient is in danger of losing both his hearing and his life. Early postauricular opening of the antrum and mastoid cells obviates these dangers. The time for operation varies according to the individual case, but the author prefers not to postpone it longer than ten days after the rupture or the incision of the membrane; it has, however, been done as late as six weeks to three months after the onset of the discharge. The longer the delay the less the chance of success. A purulent discharge indicates septic infection in and about the middle ear and it should be cut short as soon as possible.

On draining the antrum the author came upon all stages of the disease from hyperemia to the purulent and semipurulent stage. Usually the antrum or mastoid cells contain a glairy, blood stained, mucoid material and the rupture of the membrane was usually imminent. If the antrum is opened prior to the rupture of the membrane, paracentesis is usually indicated at the same time. Cases not cured shortly after the rupture or incision of the membrane often show pus in the antrum and mastoid cells and even granulations, but no classical signs of mastoid suppuration, except tenderness on pressure. The usual postaural incision is made, the mastoid is opened with gouge or chisel and all of the cells are exposed and cleared out; the antrum is freely opened up. The bone cavity is then rubbed with bipp, a gauze drain is inserted to the antrum and the rest of the wound is sutured. A dry dressing is applied for twenty-four hours but after that fomentations are applied. A small drainage tube is better than gauze. When the discharge becomes serous the wound is allowed to close. The middle ear is not interfered with except when paracentesis is done and the membranous and bony meati are left intact. The results are gratifying: the discharge from the middle ear stops immediately after the operation and the membrane undergoes complete healing, leaving no perforation and hearing is restored. In case of reinfection of the middle ear after an apparent cure, the pus works its way out through the mastoid process as a subcutaneous abscess under the postaural scar, making the reopening of the wound unnecessary.

Treatment of Aural Sepsis in Adults.—William Stuart-Low (*Practitioner,* October, 1922) says that the following rules, if thoroughly carried out by doctor and patient, will not only almost certainly relieve, but in ninety per cent. of the cases cure the condition: Never syringe the ear in acute or subacute cases, and practically never in chronic cases. When masses of hard cerumen coexist with aural sepsis, it may be necessary to irrigate very gently with warm antiseptic lotion, but always instil spirit drops immediately afterwards. Never use peroxide of hydrogen or oxydol as drops in the ear; they are feeble antiseptics, and only serve to spread the sepsis further afield. Wipe out the meatus and tympanic cavity frequently with aseptic wool on probes, and then insert antiseptic drops. Never allow wool in the ear. Daily Politzerize and suck out the ear with Seigel's pneumatic suction apparatus, and immediately afterwards mop up all discharge with wool on probes. Always see to the asepsis of the nose, mouth, and throat, and the removal of nasal obstructions in every shape and form. Enlarged tonsils and adenoids should be operated upon, and all pyorrhea alveolaris and dental caries attended to punctiliously. Make every endeavor to improve the patient's general health so as to raise the resistive power of the blood and reinforce its bactericidal qualities. See that the patient is in the open air night and day as much as possible, and that fresh uncooked food is taken liberally. Change of air to the sea is always advisable, the patient being specially instructed how to maintain the cleanliness of the ear while away. Sea bathing should be prohibited. Keep the hair back off the ears. This is most important, for the hair over the ears, impedes the aeration of the ear, and microbes gain entrance from the hair and scalp. When the scalp is very scaly, indicating the presence of seborrhea due to cocci in the hair and surface of the cuticle, the cocci fall into the ear and serve to keep up the discharge.

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DERMATOLOGY.

Treatment of Psoriasis by Manganese.—James Moore (*British Medical Journal,* July 8, 1922) reports very good results in thirty-five cases of psoriasis. His conclusions are as follows: 1. Although psoriasis appears to be of spirochetal origin, neither any of the arsphenamine preparations nor mercury has any beneficial action on it. 2. Mixed staphylococcic vaccine improves the lesions, but does not make them disappear completely without the use of chrysophanic ointment. 3. Collosol manganese clears up the disease after six to sixteen intramuscular injections without any external application. 4. Owing to the favorable action of staphylacoccic vaccine and especially colosol manganese, psoriasis is probably caused by a special staphylococcus, or it is at least closely related to chronic staphylococcus infection. 5. The disease is autoinoculable. 6. The familial occurrence of psoriasis is probably due to living under the same conditions and the subjection to the same infection rather than to heredity.

Treatment and Prognosis of Leprosy.—P. Harper (*British Medical Journal,* July 8, 1922) states that the general measures in the treatment of leprosy include, 1, regular meals of abundant food; 2, an open air life; 3, gentle exercise and daily baths, and 4, a happy frame of mind, encouraged by kindly personal interest, plenty of amusement and remunerative work. Because of its low infectivity, leprosy is an ideal disease for home treatment. The septic infections are amenable to simple surgical measures: perforating ulcers over chronic adventitious bursæ should be excised with the bursæ. The neuritis is treated by cutting down on the nerve throughout the extent of the enlargement of the nerve and by pulling the epineurium from the inflamed nerve. Rhinitis is improved with irrigation given twice daily and packing with sterile gauze. The iritis is treated in the usual manner. The specific treatment recommended by the author is the intravenous injection of crude chaulmoogra oil, sterilized by heat, giving five to fifteen minims of the oil at body temperature one to three times daily. A fortnight's rest is given after four weeks' injections and the treatment is then continued until a reaction occurs, when the treatment is stopped until the reaction has passed. The treatment reaction consists of fever, eruption and neuritis markedly resembling the true leprotic fever, followed by improvement. The treatment must be continued for years. Early and mild cases have a fair chance of cure or arrest of the disease. Pure nerve leprosies have been arrested. The advanced nodular cases or those with marked nerve deformity are incurable. In many cases, leprosy seems to prolong life, possibly as a result of the careful mode of life, and death usually results from an intercurrent disease, chiefly tuberculosis and sepsis.

The Action of Flavine Antiseptics on Localized Pyogenic Infections, With Special Reference to the Processes of Healing.—C. Bennett, J. W. Blacklock and C. H. Browning (*British Medical Journal,* August 19, 1922) in over six hundred cases, including burns, ulcers of the leg, carbuncles, cellulitides, osteomyleitides, acute suppurative bursitides, abscesses, septic hands and fistulas in ano, found that the results from continuous treatment with flavine antiseptics (acriflavine and proflavine) in comparison with other methods of treatment, showed no interference with the formation of granulation tissue. The points especially investigated were those of the rate and progress of the formation of granulation tissue, of ossification and of the healing of the skin epithelium. There was no evidence of pellicle formation or necrosis. There was no unusual tendency to hemorrhage, more than occurs ordinarily with healthy granulations during a change of dressings. Ossification proceeded actively in periosteal granulation tissue. Epithelial regeneration proceeded actively in contact with dressings soaked in flavine solution. The histological examinations confirmed and supplemented the clinical observations.

Technical Fundamental Principles in the Use of Dermographism as a Method of Examining Bloodvessels of the Skin.—Leonard Schwartz (*Schweizerische medizinische Wochenschrift,* August 17 and 24, 1922) devised a simple and handy apparatus for the production of skin reactions. If a symmetrically favorable area of skin (on the chest) is selected, and if the period of latency between the irritation and the appearance of the dermographic reaction is determined, both as to intensity and as to duration, it is possible to obtain a series of similar reactions, so that the subsequent investigations regarding the effect of any desired agent on the bloodvessels of the skin may be possible.

Familial and Constitutional Polycythemia Rubra.—Hans Curschmann (*Acta Medica Scandinavica,* November 29, 1922) finds no proof of the supposedly frequent endocrine anomalies in his three cases of familial polyglobulia and one nonfamilial, although a constitutional case of this disease. Endocrine disturbances are rarely found as symptoms in polyglobulia. Familial polyglobulia and cases beginning in early childhood and remaining latent for as long as ten years are not infrequently met with. The endocrine system plays no rôle in this disease.

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A Few Points Regarding the Diagnosis and Treatment of Gallbladder Lesions*

By MAX EINHORN, M.D.,

New York.

Soon after the appearance of the duodenal tube, it was quite natural to examine the duodenal contents in affections of the organs contributing toward its formation. In 1914 I published a paper (1) relating to this subject. This paper was followed by several others showing the importance of the direct examination of the bile in the fasting condition of patients suffering from gallbladder disease, for under those conditions pure bile could be obtained without the admixture of food or much gastric secretion. It was found that in normal persons the bile appeared golden yellow and was either perfectly clear or only slightly, if at all, turbid. In patients affected with stone or severe gallbladder lesions, the bile was found to be turbid, often having the appearance of yellow or greenish pea soup. Microscopically, numerous cholesterin or calcium bilirubin crystals, pus cells, mucus, bacteria, and occasionally a few red blood cells were found; and at times in the aspirated bile sample minute particles of concretions or mucus containing some solid material of pinhead size were discovered. On putting these under the microscope, conglomerations of various crystals would be observed. Often such findings indicated the probable presence of a stone, which upon operation was found to be correct. While a few crystals of cholesterin found here and there in the bile is not necessarily indicative of stone, if a great many of these are found clustered together, especially of large size, it usually indicates the presence of calculus.

The bile found in the duodenum usually contains bile from the liver mixed with some gallbladder bile. Attempts to obtain pure gallbladder bile or the segregation of liver bile and gallbladder bile have been made by Stepp (2) and later by Lyon (3).

I may here be permitted to give in a few words the origin of the belief that gallbladder bile as such can be obtained. Rost (4) did a great deal of experimental work on animals into which he had introduced a tube through a duodenal fistula. Originally he intended to study the action of various medications as bile stimulants (cholagogues). He observed that peptone (Witte's) when introduced into the duodenum led, after a few minutes, to the appearance through the tube of an abundant flow of dark bile. In animals, however, in which the gallbladder had been removed, this did not occur. He ascribed this phenomenon to the action of the peptone on the gallbladder causing a contraction of the latter and the emptying of its contents. This explanation appeared to be plausible, since the gallbladder is supposed to have the faculty of concentrating the bile. Stepp made use of these experiments and applied the same principle to the direct examination of the bile in man. He therefore injected into the duodenum five per cent. of the same solution of peptone (thirty c. c.) and soon noticed that here, too, a few minutes after the injection, an abundant flow of bile resulted, having also a very dark brown color, the flow lasting for several minutes, when a change of color took place. He therefore thought, like Rost, that the dark bile originates from the gallbladder, ascribing it to an emptying of this organ.

Meltzer (5) suggested the use of magnesium sulphate through the duodenal tube in order to relax the sphincter of Oddi, and to produce an emptying of the gallbladder, following the law of contrary innervation.

Lyon made use of Meltzer's proposition, and applied the magnesium sulphate to the direct examination of the bile in man, and came to the conclusion that it was possible to segregate the bile from its different sources, which he named a, b, and c bile, b indicating the dark gallbladder bile, and he must be given the credit for having promulgated this method of diagnosis and treatment.

The view, however, that the dark bile appearing after the instillation of magnesium sulphate or peptone is merely gallbladder bile, is not correct. In a paper (6) read before the Clinical Society of the Lenox Hill Hospital on December 10, 1920, I set forth a number of facts which do not seem to tally

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*Read before the Atlantic County Medical Society on January 12, 1923, at Atlantic City, N. J. (From the Lenox Hill Hospital.)

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with the accepted view of Lyon and Stepp. The reasons why the theory of the dark bile emanating from the gallbladder cannot be sustained are the following:

1. If one follows the variations in color of the duodenal contents after the introduction of magnesium sulphate or peptone, it will be observed that the change from yellow to dark brown does not take place abruptly, but rather gradually; at first the contents appear light yellow, then they show a deeper yellow, then brown, and ultimately a dark brown color. This color reaction lasts a few minutes, when a gradual reverse or a diminution of the color reaction takes place. Neither does the change of color at this time occur suddenly, but it forms a gradual mutation of colors from dark brown to light brown, yellow, and golden yellow. If the dark colored bile were due to an emptying of the gallbladder the change would appear and end more abruptly.

2. Magnesium sulphate given in different strengths produces different degrees of color reactions. That means that a twenty-five per cent. solution of magnesium sulphate produces a much darker bile than a ten per cent. solution. This likewise could not be the case if the dark bile was due to an emptying of the gallbladder, because the bile from the gallbladder must always look the same.

3. The specific gravity of the dark bile obtained after magnesium sulphate instillation is much higher than that obtained after a peptone instillation. This, again, would not be possible if the substances injected acted merely as openers of the gallbladder.

4. A great many other salts besides magnesium sulphate, such as sodium sulphate, and others, act in a similar way, producing dark colored bile. Meltzer's theory of the mechanism opening the sphincter of Oddi could not explain why sodium sulphate, which has no effect on the sphincter, could produce dark bile.

5. Soon after having emptied the gallbladder through magnesium sulphate or having accomplished a cycle of bile, another instillation of magnesium sulphate or peptone in some instances produces another cycle of color reaction, exactly the same as the first. This would hardly be possible if the dark colored bile were due to an emptying of the gallbladder, because then the second injection could not immediately produce a second emptying, the gallbladder being empty already.

6. Patients whose gallbladders have been removed, frequently show similar reactions after magnesium sulphate or peptone instillation, clearly showing that the gallbladder, as such, can have nothing to do with this phenomenon of color changes in the bile.

It appears to me, therefore, that these changes are due to reactions of these different substances on the liver, influencing its activity and thus producing the mutations in color.

When I was in Carlsbad last summer, Professor Stepp asked me how I could explain Rost's experiments, and since then I have taken pains to peruse carefully the entire series of Rost's experimental work, reaching the conclusion that while his experiments are all correct, his deductions could be differently explained. Thus, he found that in some animals in which the gallbladder had been removed, there was, after the lapse of a few months, a return of dark bile. In some of these animals he found upon autopsy that a new gallbladder had formed; in others, however, there was no gallbladder present, and still the dark bile had existed during life after the peptone injections. Rost, instead of saying that the peptone acted on the liver—since in these cases there was no bladder which could contract—assumes that the bile must have been kept back in the bile ducts of the liver and there assumed the dark color. This, however, is not plausible, for there is no reason for bile to be concentrated in the bile ducts. The reason why in some of the cholectomized animals there was soon after the operation no dark bile reaction following peptone instillation is that the operation, as such, acts as a disturbing factor on the liver, in this way diminishing its functional activity.

Recently a great many other clinicians have likewire refuted Lyon's and Stepp's theory (*7*).

X ray examinations are certainly of great value in the diagnosis of some affections of the gallbladder, especially if these are complicated with stones. It is, however, well to remember that a great many biliary calculi do not appear on the plate. Again, in exceptional cases, shadows are seen resembling biliary calculi which operation fails to substantiate. Notwithstanding this, I consider this means of diagnosing the presence of calculi as of the greatest importance.

As is well known, acute attacks of upper abdominal colic, with intervals of euphoria, are characteristic of gallbladder trouble. There are, however, cases which run an entirely different course. Local symptoms may be present or may be entirely missing, while there exist reflex disturbances which can be ascribed to the gallbladder lesions. Among these may be considered of importance the following types of disturbance: Migraine and bilious vomiting; angina pectoris; cardiospasm, and intestinal obstruction.

1. Severe migraine with bilious vomiting is occasionally caused by gallbladder trouble with or without stones. As an instance of this type, the following case may be briefly described:

Case I.—Mrs. J. H. suffered for many years with severe attacks of migraine occurring every two or three months, accompanied by vomiting and lasting for two or three days. Upon examination a condition of enteroptosis and movable kidney was found. A supporting abdominal bandage was applied and a general régime to build up the system was instituted, with fairly good results. The migraine, however, persisted, although occurring less frequently. About five or six years ago an x ray examination of the gallbladder region showed stones to be present; a direct examination of the bile likewise furnished all the signs of severe cholecystitis, with probable stones. The patient was operated upon and the gallbladder and stones removed. Since then the patient has remained entirely free from migraine.

2. Occasionally it is difficult to decide whether an attack of upper abdominal colic accompanied by a feeling of constriction in the chest and perhaps embarrassment of breathing is due to a circulatory disturbance (angina pectoris) or to a gallbladder lesion. A correct diagnosis in such a condition is of great importance for the patient: for while a circulatory disturbance can be handled with great difficulty and

is likely to interfere with the patient's mode of life, without any bright prospects for the future, the other (the gallbladder condition) is much easier to manage and can often be entirely cured. Whenever a condition of angina pectoris is found in a comparatively young man—say from thirty to fifty—in whom there is a mere suspicion of the presence of a gallbladder lesion, the case should be thoroughly investigated, and if any points are found corroborating such a condition the treatment should be arranged accordingly. Recently, I have observed two cases of this type. In one, the diagnosis of angina pectoris had been made by the best New York clinicians. The patient could hardly attend to his business and had to lead a very restricted life; but when a diagnosis of gallbladder lesion was made through the direct examination of the bile, an operation for the removal of the gallbladder and several calculi was performed, and the entire situation was changed. The patient is now able to do anything he wishes. Another patient with a similar disease complex (angina pectoris), manifested jaundice in one of his attacks, which helped to simplify the diagnosis of gallbladder lesion with probable obstruction of the common duct. The patient was operated upon, and the gallbladder was found to be much diseased and constricted, but no stones were present.

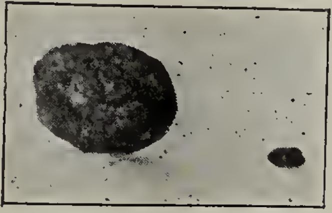

Fig. 1—J. A. G. Stone found in cystic duct at operation on October 30, 1922. The small particle to the left shows one of the many concretions which emptied from the common duct. One half times natural size.

Here I would like to emphasize that at times the diagnosis of a biliary calculus appears to be quite certain and yet a stone may be absent, the symptoms being due only to the gallbladder itself. It is important to remember this so as to be able to advise the patient accordingly.

3. Cardiospasm or dysphagia due to cardiospasm as a reflex of gallbladder trouble is not an uncommon occurrence. One patient, J. B., in whom a cardiospasm was discovered shortly before a gallbladder operation (the patient being unable to swallow or eat) was entirely cured after the removal of the gallbladder.

4. General tympanites and vomiting, accompanied by a rise of temperature, simulating intestinal obstruction, may be due to a gallbladder lesion. Dr. Willy Meyer and I observed a case of this sort, in which the removal of the gallbladder, with stones, relieved the condition.

As an illustration of the great importance of the history and the direct examination of the bile, in making a diagnosis, the following case may be cited, which came under my observation recently. I give the history as written by the patient himself:

Case II.—J. A. G., aged forty-one, "a moderate smoker and drinker. To the age of fourteen years, was always very strong, but suffered from severe headaches at school. Started work at fourteen years in a quarry office, articled to an architect; served as an engineer on tunnels in London, and as a civil engineer in Malta on sea work. After 1907 was for some years in Canada in charge of open air construction work, getting plenty of exercise. After 1915 started in business for himself, exercise being curtailed thereby. Had always held positions of trust and responsibility, at times involving considerable mental strain.

"At nineteen or twenty years of age, while in London, was very liverish and suffered from continued deep depression. At twenty-four, in Malta, had some jaundice. In Canada, was very liverish at times and subject to fits of depression. Have suffered from severe headaches and pain in back for last eight or nine years. Generally healthy, below par, but lost practically no time from business until 1916, when at the age of thirty-six had a nervous breakdown, stomach and eyes being affected. When recovered, still continued to have stomach acidity, headaches, and depression.

"In 1922 suffered from continued acidity, lack of appetite and considerable lack of energy. In July, August, and on the 13th of October, suffered from severe pain in the right side, which was ascribed to indigestion. Two days after the attack of pain in October, jaundice developed, which cleared up at the end of ten days. Pain in the right side almost continuous ever since the October attack. Urine very light brown from October 13th to November 1st. Was in bed from October 13th to October 30th; but continued on liquid diet, no fat, from October 13th to November 20th. Since then, kept on solid diet with no fat.

"Pains are on right side, about the last rib, start very mildly and become intense in from three to six hours. Pain radiates to left and to back up to shoulder blade; practically always stops suddenly, leaving a feeling of exhaustion. Pains start at all times, but seldom during the night. Have not had to take morphine, or other drugs. Position of body does not influence pain. Since about November 20th, have greatly improved in general condition, and acidity practically not existent. Bowels always very regular. Only medicine taken has been a mineral water and a few doses of liquid petrolatum."

Report of x ray examination, October 30, 1922. "Gallbladder region does not show the presence of gall stones."

November 1, 1922: "X ray examination of gastrointestinal tract suggests the presence of a duodenal lesion. Stomach is small, regular in outline, hypertonic, active; no tenderness present. Duodenum fills indistinctly; at one and a half hours about one quarter of meal is present in the stomach. At three hours the stomach is empty and head of column is at the splenic flexure. At six hours, greater portion of meal is in the large bowel, there being little change in the advance. At twenty-four hours, practically the entire meal has passed." W. A. Wilkins, röntgenologist Montreal General Hospital.

When I examined patient the gastric contents showed a condition of hyperchlorhydria, and the string test showed a blood stain at twenty-three inches from the lips. The bile was turbid, containing pus corpuscles and calcium bilirubin crystals. In the duodenal contents, which were turbid, a blackish looking particle of pinhead size was found, which upon microscopic examination proved to consist principally of debris and calcium bilirubin crystals. A diagnosis was made of duodenal ulcer combined with gallbladder trouble (probably stone in the cystic duct). The patient was first treated with duodenal alimentation in order to cure the ulcer, and then an operation was advised for the gallbladder condition. Dr. Willy Meyer operated upon the patient. The gallbladder was not adherent, and to outward appearance it was almost normal. On palpating it the surgeon at first had difficulty in discovering anything wrong, but on further search a concretion was detected in the cystic duct, and on removing the gallbladder a solitary black stone was found in the cystic duct (Fig. 1), while many small concretions were discovered, when the common duct was incised. When the gallbladder was opened the bile was dark and putrid. Here the history combined with the examination of the bile cleared up the diagnosis.

TREATMENT.

The treatment of gallbladder lesions may be either medical or surgical, or both. As a general rule, however, I would say that whenever feasible all cases should be treated medically only, unless there are sufficient reasons for employing surgical measures. Frequent eating, the drinking of much water, and hygienic living are all important. Many clinicians institute a rigorous dietetic régime in gallbladder lesions. Thus, all fats are prohibited, likewise eggs, and other articles of diet; while as a rule the diet in these cases should not be rich, I am in favor of not forbidding too much. Eggs are generally forbidden because they contain a great deal of cholesterin, but being impressed with the great value of this substance in the cell life, I see no reason for forbidding it. As it is usually carried out by most clinicians, the diet is too weakening for the organism; for in order to fight the disease the body must be kept in good nutritive condition.

The instillation of various medicaments into the duodenum (argyrol, ichthyol, mercurochrome) may be undertaken with advantage; the drinking of Carlsbad water, or the like, at home or at the spring seems to be beneficial; glycerine in teaspoonful doses before meals is often useful; salol and urotropin are also frequently given with advantage. Lyon employs magnesium sulphate instillations into the duodenum, and then drainage of the contents.

The indications for surgery may be put as follows:

1. Severe attacks of biliary colic appearing frequently and interfering with the patient's well being —especially if accompanied by a slight rise in temperature.
2. Biliary colic accompanied by fever and a high leucocytosis with an increased polynuclear count, and jaundice.
3. Pains in the gallbladder region accompanied by chills and a high leucocytosis.
4. The indirect reflex symptoms mentioned, such as angina pectoris and cardiospasm, existing for a considerable length of time and reducing the patient's strength.
5. Gallbladder lesions with probable malignancy.

When an operation is performed in these gallbladder conditions, the surgeon is likely to find associated lesions in the abdominal cavity which require attention. Here I would like to say that the operation should not be too extensive, and if conditions are found which are the result of nature's reparative processes they should be let alone if possible. I know of two cases of duodenal ulcer with gallbladder lesions in which by natural processes a stone had left the gallbladder, the gallbladder having become adherent to the duodenum and perforating it so that the gallbladder was in direct communication with the duodenum. The surgeon after performing a gastroenterostomy, tried also to do some plastic work on the duodenum after excising the gallbladder, with bad consequences.

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20 EAST SIXTY-THIRD STREET.

Duodenal Motility*

By HOMER WHEELON, M.S., M.D.,
Seattle, Washington.

The purpose of this paper is to offer certain experimental findings which, I hope, will tend to a more thorough understanding of the motor phenomena of the duodenum. The amount of information pertaining to the stomach and intestines as a whole is such that a comprehensive understanding of their normal functionings makes possible a rational interpretation of functional deviations. Quite the contrary is found relative to the duodenum specifically. The general state of knowledge concerning the motility of the duodenum is well illustrated by Carmen (1) who states:

"Peristaltic movements in the duodenum are difficult to detect. Under ordinary circumstances the bulb is seen to fill, then suddenly to overflow into the descending and transverse portions, through which the barium races quickly, and the entire duodenum is more or less completely evacuated, seemingly as though by syphonage, rather than by an active, expulsive contraction of the duodenum itself. However, competent observers, including

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*From the Polyclinic, Seattle, Washington. Read in part before the King County Medical Society, Seattle, Washington, November 6, 1922.

Holzknecht, have noted actual peristalsis, rhythmical in character, at minute long intervals."

Again, to quote Alvarez (2a):

"The duodenal cap tends to remain filled during the early stages of digestion. This may be due to the low rhythmicity of the muscle in that region, to its thinness and weakness (in man), to its firm attachment to the mucous membrane and perhaps to the peculiar festoonlike arrangement of the fibres. Particularly towards the close of gastric digestion there is normally regurgitation of duodenal contents into the stomach. Once past the cap the food runs rapidly through the rest of the duodenum and jejunum."

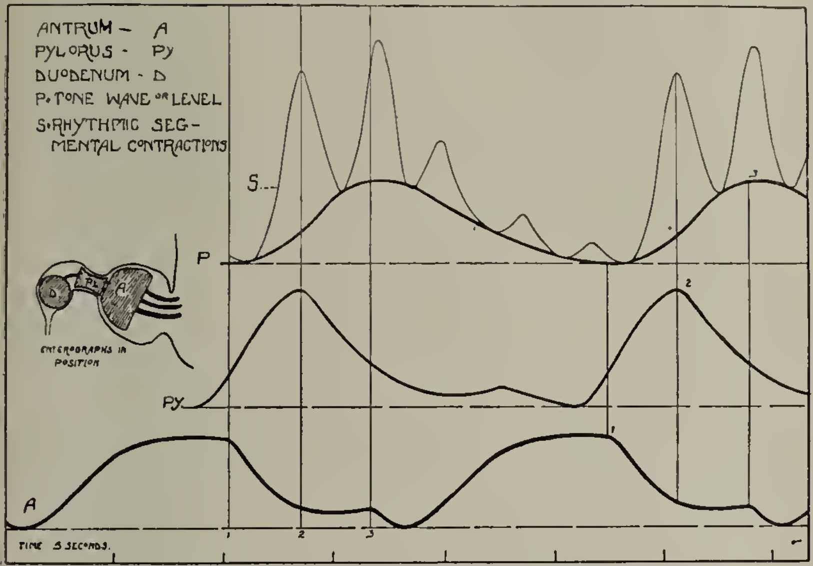

Fig. 1.—Diagram showing the average relation of motor activities in the duodenum, pylorus and antrum of the dog. Data for the compilation of this diagram was obtained by the use of enterographs placed in the lumen of the three parts. The diagram is so arranged that a complete cycle of motility is represented as beginning in the antrum and ending in the duodenum. 1, 2, 3, lines drawn to show synchronous points on the three curves. The insert represents the portions occupied by the enterographs. Note that the maximal contraction in the three parts appear in sequence also that the duodenum is at its greatest degree of relaxation after the antrum has ceased contracting and during the period of rapid contraction of the pylorus. The maximal height of contraction, P. wave, in the duodenum occurs while the antrum is relaxing prior to a succeeding wave of contraction.

At the present time two types of movement are recognizable in the small bowel; first, rhythmic segmental contractions and, second, peristalsis.

"Rhythmic segmentation" of the small bowel, first studied radiographically by Cannon (3a) and graphically by Bayliss and Starling (4), is characterized by movements which divide and redivide the food mass but which do not carry the intestinal content downward. Radiographically observed (animals and man) such contractions appear from five to ten centimetres apart, divide the food column into sections and then give way to similar contractions arising midway between points of previous contractions.

The forward movement of food in the small bowel, as in the stomach, accompanies peristaltic waves or socalled peristaltic rushes (2). Such waves, as shown by Bayliss and Starling (4), are characterized by contraction of the gut musculature above the food mass and relaxation below—law of the intestine.

From the foregoing statements relative to the small bowel it might be inferred that motor activity of the duodenum is of the same nature; however, the paucity of exact information on this point is a challenge to any such deduction.

The following discussion, to a large extent, is based upon the results of animal experimentation.[1] It is true that observations made on one type of animals are not entirely applicable to other types. However, it has been by animal experimentation that many of the principles of human physiology have been established.

The most constant type of motility, graphically observed, in the descending portion of the duodenum is that of rhythmic segmentation. The contractions, occurring at an average rate of fifteen a minute, may be observed during gastric activity or inactivity, also during tone changes in the duodenum itself. Small amounts of morphine or pilocarpine seem to enhance this type of motility.

During active gastric motility, rhythmic contractions of the duodenum show marked alterations in the height of the individual contractions and the tone level from which they are initiated. However, these alterations recur periodically and in such a manner that a line drawn to connect the points of greatest relaxation—tone level—forms a twophased wave. These twophased waves, in turn, are rhythmically repeated; that is, they depend upon the periodical grouping of the segmental contractions.

This type of motility may be observed in anesthetized and unanesthetized dogs for long periods of time, especially if the stomach is active. Further, this periodicity in the grouping of segmental contractions bears a definite relation to gastric motility. This point I wish to discuss more fully for through its interpretation we derive the conclusion that the periodical alterations in the extent of segmental contractions is representative of the passage of true peristaltic waves. For brevity's sake, I will quote

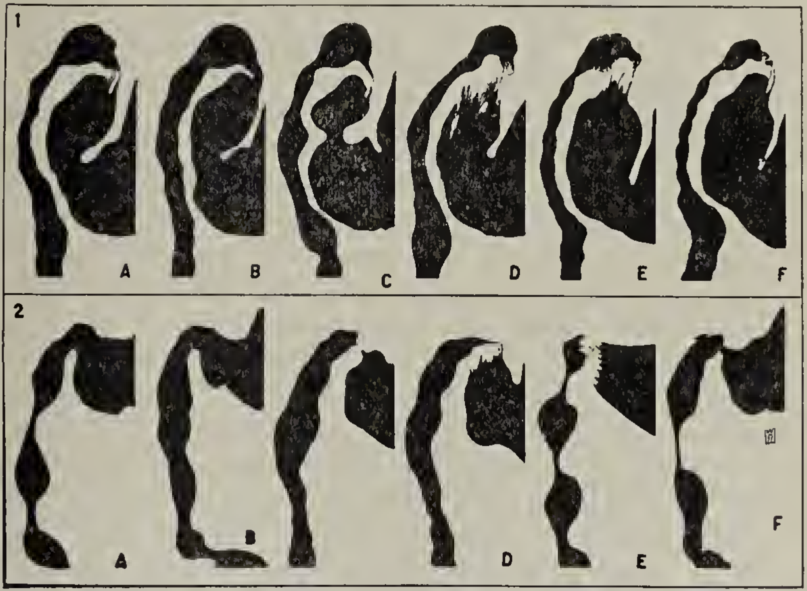

Fig. 2.—Copies of radiograms (dog) showing the sequence of motor activities in the antrum, pylorus and first portion of the duodenum. The exposures for each series (1 and 2) were made approximately fifteen seconds apart, hence they do not show a true series of events for a specific gastric motor cycle. However, the positions shown were repeatedly obtained on the same animal and comply so fully with results obtained by graphic means that they may be taken as representative of the various position of barium during the passage of a peristaltic wave over the stomach and duodenum. As will be noted, an active antrum is associated with a patent pylorus and filling duodenum. The pylorus is seen forcibly contracting at the close of the antral positive phase and while tone is mounting in the duodenum. During this time the antrum rapidly relaxes. During the period of relaxation of the antrum and pylorus the duodenum shows marked activity. At F is shown the condition just previous to the appearance of a second positive wave in the antrum.

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[1] The writer is keenly aware of the limitations incident to acute experiments. It is true that information so gained is not to be considered as entirely indicative of normal activities. However, when dissimilar methods yield similar results it seems reasonable to believe that such results are indicative of functions normal to the organ studied (5).

concerning this point from a previous paper. (5-b) "Direct, graphic and radiographic observations show that the antrum and pyloric sphincter are rhythmical in action, that is, contractions and relaxations follow each other in a regular sequence. These rhythmical actions or cycles occur at the rate of from three to five a minute, and are maintained for hours."

"The sequence of action in the pars pylorica is as follows: During the active phase of the preantrum there occurs a loss of tone or inhibition in the antrum as a whole. This is immediately followed by a gradual or running contraction of the antrum, the entire antrum demonstrating a sustained contraction or plateau as the final act of its positive phase. This is followed by a wave of relaxation, which, starting in the preantral region, passes over the entire antrum. The sphincter, on the other hand, demonstrates a negative phase (relaxation) at the time of beginning antral contraction. Sometime before the antrum enters upon its held contraction the sphincter begins to contract rapidly and reaches its maximum, usually at a time of marked relaxation of the antrum. The sphincter then relaxes and remains quiet until a second positive phase is well initiated in the antrum. Hence, the sphincter is open during the greater part of the antral contraction and actively closed while the antrum is relaxing" (Fig. 1). In other words, the pyloric sphincter acts as any segment of gut to the passage of a peristaltic wave.

Segmental contractions of the duodenum are greatest during the period of beginning antral relaxation. They are smallest at the height of antral contraction. The level from which the individual segmental contractions occur is greatest after the onset of antral relaxation and least immediately following completion of antral contraction and while the pyloric sphincter is rapidly contracting. The tallest segmental contraction in the periodically repeated grouping of contractions arises from the point of greatest tone depression and rapidly mounts to complete its positive phase synchronous with that of the sphincter. (Fig 1.) The second and usually the third segmental contractions of the group arise from higher tone levels, while remaining contractions arise from progressively lower levels. Hence, as stated above, a line drawn to connect the points of greatest relaxation in any group of segmental contraction forms a wave (line P in Fig. 1), which has a definite relation in sequence of appearance to those formed by the antrum and sphincter, that is, the duodenal wave begins its positive phase sometime after the antrum has ceased to contract and while the sphincter is rapidly contracting. The greatest height of the duodenal wave occurs at a time when the antrum is "inhibited" preparatory to a contraction and while the sphincter is rapidly relaxating. The inactive phase then continues throughout antral and the greater part of sphincteric contractions. Inasmuch as the motility of the three parts is rhythmically repeated, it may be concluded that the wave shown in the duodenum is the result of the passage of a progressive wave into it from the stomach.

If this conclusion is accepted, then an easy explanation may be offered for the peculiar grouping of segmental contractions of the duodenum. If the socalled law of the intestine, as applied to peristalsis in the stomach and small bowel, is applied to the antrum, pyloric sphincter and first part of the duodenum, then it becomes apparent that a positive phase, for instance in the antrum, would be associated with inhibition of the sphincter and structures below. The passage of the positive phase into the sphincter would be associated with relaxation of the antrum and duodenum. Once the positive phase had passed into the duodenum, the antrum and sphincter should show relaxation. This, as already mentioned is the observed phenomena as graphically (Fig. 1) and radiographically (Fig. 2) obtained.

Segmental contractions of the duodenum may, and often do, occur independent of any other type of motility. At such times, however, the individual contractions occur from a constant level and are of the same height. As already mentioned, segmental contractions of the duodenum, during active gastric motility, tend to group themselves in series of rhythmically appearing differences in height and level from which they occur, the rate remaining constant. Hence, if diphasic waves of motility are passed over the duodenum then segmental contractions should be enhanced during the passage of the positive phase and increased tone and depressed during the passage of the relaxation phase and decreased tone. That is, the height of contractions and the tone level from which they occur should be greatly influenced by the running of a peristaltic wave over the duodenum.

At the present time there seems to be a rather ill defined belief that gastric and duodenal motor activities are separate and distinct processes. However, when it is remembered that the duodenum is called upon to receive material from the stomach it becomes evident that the two portions must work harmoniously for the general economy.

I am of the belief that a more thorough understanding of the physiology of the pyloric sphincter would have led to a better understanding of the motor activities of the duodenum. The previous teaching of an "acid control of the pylorus" (3-b) left one to infer that the duodenum was forced to receive material from the stomach at such times as the acid concentration of the gastric chyme was sufficient to effect an opening of the sphincter. More recent studies, especially those of Cole (6), Luckhardt, Phillips and Carlson (7) and Wheelon and Thomas (5-c) have pointed to the conclusion that the sphincter acts in principle as any other portion of the gastrointestinal tract, the differences in detailed action depending upon differences in the mass and gradients (Alvarez 2) of contractile units.

The striking difference between the motility of the stomach and the duodenum is the apparent absence of segmental contractions in the stomach.[2] Here then is a condition in the duodenum which must be brought into correlation with peristalsis.

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[2] Alvarez (2-b), has recently shown that there are "a number of different types of gastric peristalsis" and that "the stomach can change suddenly from one to another. At times, there seems to be a dissociation between the activities of the fundus and the pars pylorica. The fundus can contract several times to the antrum's once. Small, frequent waves are sometimes superimposed upon the larger, slower ones."

As shown above, the first segmental contraction of the duodenum when occurring in a series of repeated variations, arises from a low tone level and rapidly contracts to reach its maximum synchronously with the closure of the pyloric sphincter. The second contraction, although arising from a higher tone level, is completed after the stomach has begun to relax and while the peristaltic wave in the duodenum is announced by the increased activity of the segmental contractions. The first segmental contraction in the duodenum following the arrival of the peristaltic wave is completed synchronously with that of the sphincter some three seconds following beginning relaxation of the antrum. Hence, the first segmental contraction entering upon its positive phase acts to carry on the function of the pyloric sphincter in that its positive phase is completed along with that of the sphincter, and while the peristaltic wave is gaining strength in the duodenum. Once the positive phase of the peristaltic wave is established the sphincter need no longer remain closed for the reason that the gastric (antral) portion is in a state of relaxation preparatory to the passage of a succeeding peristaltic wave.

These presentations and conclusions find certain corroboration in the studies of Alvarez (2). According to this observer "peristaltic rushes may seem to arise in any part of the small bowel and may run either short or long distances. Many graphic records show, however, that even the short rushes, which, so far as the eye can see, have arisen in the lower ileum, are generally based upon ripples which have come from the duodenum. As some of these ripples can be shown to have left the first portion of the duodenum just after a gastric wave reached the pylorus, it may easily be thought that they had their origin as high as the stomach."

According to my findings the supposition offered by Alvarez is substantiated, that is, peristaltic waves in the duodenum have their origin in the stomach.

Since the publication of my experimental work (5-c) and the prophesy stated above, Alvarez (2-b), working with his newly devised electrogastrograph, was able to verify his own prediction. In speaking of his results he states:

"Another interesting point brought out with the new method is that the stoppage of the gastric waves at the pylorus is not so complete as has hitherto been thought. We can see now that the approach of a wave in the pars pylorica is the signal for the appearance of a strong tonus wave in the first portion of the duodenum. The new records show, moreover, that the rush waves down the bowel always originate in a gastric contraction, which, as we have seen, raises the tone of the duodenum."

CONCLUSIONS.

1. The duodenum of the experimental animal executes two types of motility; first, segmental contraction; second, peristaltic waves.

2. Peristaltic waves in the duodenum bear a definite relation to the sequences of motor activity in the antrum and pyloric sphincter.

3. Hence, peristaltic waves in the duodenum may be considered as having their origin in the stomach.

The author's references will appear in his reprints.

Some Observations on Duodenal Alimentation*

By JULIUS FRIEDENWALD, M.D.,
Baltimore, Md.,
Professor of Gastroenterology, University of Maryland
and
PAUL FOREMAN WIEST, M.D.,
Baltimore, Md.,
Assistant in Gastroenterology, University of Maryland.

Since Einhorn (1) first described his method of duodenal alimentation this procedure has been utilized to great advantage in the treatment of a variety of affections of the gastrointestinal tract. The various publications of Einhorn, as well as those of many other clinicians, attest to the accuracy of this statement. Notwithstanding the simplicity of its application, as well as its advantages in many affections well recognized by the specialist, it has not as yet received that general acceptance from the practitioner that its value merits. It is on this account that we are desirous of again directing attention to this method of treatment, by no means new, but which to us in many instances has been without question a life saving measure.

The duodenal tube is ordinarily swallowed in the morning with the stomach in the fasting state. Formerly it was thought that in order to have the tube enter into the duodenum it was necessary to pass it at night when it usually found its way into the duodenum on the following morning. It is unnecessary, however, under ordinary conditions to pursue this long procedure. As a rule if the tube is swallowed in the morning on the fasting stomach it will enter the duodenum in from twenty to forty minutes.

In order to accomplish this with greater facility, the method advised by Lyon should be followed. The tube is swallowed to the 55 cm. mark. A small glass of water is taken to increase peristalsis and the patient, then lying on his right side, is required to make slow swallowing movements which gradually induce the passage of the tube to the 75 cm. mark. As Lyon points out, and our observations are entirely in accord with his, the slow swallowing movement is often the secret of the rapid entrance of the tube into the duodenum.

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*From the Gastroenterological Clinic of the Department of Medicine, University of Maryland.

In order to determine whether the tube has entered the duodenum, it is necessary only to aspirate with the ordinary glass syringe, when usually a light golden yellowish fluid appears. At times, the contents may be slightly amber in color and turbid or a yellow brown. The secretion is usually alkaline, though at times it is neutral or even acid in reaction. Another simple method to determine the location of the tube used by us is to inject a barrel of air from the syringe through the tube. If the tube has not passed the pyloric sphincter a loud gurgle is heard. Should it be in the duodenum a somewhat fainter and more distant gurgle is elicited. After the injection of the air, if an attempt be made to withdraw the plunger one is able to recover the air if the tube is in the stomach, which is impossible should the tube be in the duodenum, due to its smaller calibre and a vacuum which is more readily produced.

While the method mentioned above is not infallible, it affords a fairly accurate working guide. In cases in which there is any doubt as to the localization of the tube, the bulb can be definitely located by means of fluoroscopy.

In those instances in which there is great nausea and vomiting, it is still best, according to our experience, to pass the tube at night while the patient is resting quietly under the influence of a hypodermic injection of codeine or morphine, when it will usually, even in those instances in which the vomiting has been extreme, find its way into the duodenum by the following morning.

As soon as the tube is securely in the duodenum, feeding may be inaugurated at once. Any liquid food may be employed, but mixtures of milk, sugar and raw eggs are the most useful. Care should be taken to see that there are no particles in the food to clog the tube. The amount at the beginning should be small, 100 c.c. every two hours, beginning early in the morning and discontinuing late in the evening.

This quantity may be increased gradually up to 300 c.c. If eight feedings are given in twenty-four hours and each feeding consists of 280 c.c. of milk, one egg, and one tablespoonful of sugar of milk, the patient will receive approximately 2280 calories, which is ample for an average person, and if the patient is at rest in bed it is sufficient to allow a gain in weight.

Einhorn has perfected a special syringe, with which it is possible to administer the food without disconnecting the tube. Morgan has suggested a method like that of Murphy for giving salt solution by rectum, permitting the fluid to flow from an irrigating jar, and so arranging the petcock that the food is taken slowly, the 300 c.c. of nourishment taking about twenty-five minutes. We have at times found this procedure exceedingly useful. The food should be administered at body temperature and the heating should be done slowly, for if it becomes too hot it is likely to become thick and lumpy. After heating, it is well to strain the food to be certain to have it free from small particles. If the food is used too warm or too cold it is apt to cause uncomfortable symptoms, sometimes causing the patient considerable shock; a too rapid administration causing flatulence. After each feeding a syringeful of water at 98°F, should be injected, then the petcock closed and the syringe filled with air, which should be injected after the petcock has been opened; the petcock should then be closed and syringe disconnected. This procedure is important and serves to keep the tube clean and empty. If this procedure is not carried out, small masses of food are likely to be drawn into the lower part of the tube, which may necessitate its removal.

Einhorn advises the following diet list in some instances:

7:30 A.M.	Oatmeal gruel ..	180 c.c.
	One egg	
	Butter	15 gm
	Lactose	15 gm
9:30 A.M.	Pea soup	180 c.c.
	One egg	
	Butter	15 gm
	Lactose	15 gm
11:30 A.M.	Same as 9:30	
1:30 P.M.	Bouillon	180 c.c.
	One egg	
3:30 P.M.	Oatmeal gruel ..	180 c.c.
	Butter	15 gm
	One egg	
	Lactose	15 gm
5:30 P.M.	Pea soup	180 c.c.
	Butter	15 gm
	One egg	
	Lactose	15 gm
7:30 P.M.	Same as 5:30	
9:30 P.M.	Bouillon	180 c.c.
	One egg	

TOTAL:	
Oatmeal gruel ..	360 c.c.
Pea soup	720 c.c.
Eggs	8
Lactose	90 gm
Butter	90 gm
Bouillon	360 c.c.

At times when there is a tendency toward diarrhea milk sugar must be omitted and when there is an idiosyncrasy toward milk, this form of food must be withdrawn and broths of various kinds (beef, vegetable) or malted milk may be substituted. When milk is well borne its caloric value can often be greatly increased by the addition of varying quantities of cream. It is interesting to note that patients fed by means of the duodenal method usually retain their weight and strength during the entire course of treatment.

The tube rarely causes disagreeable symptoms in the form of nausea or discomfort in the abdomen, if the precautions already noted are carefully followed; it may be retained as long as ten to fourteen days at a time, after which it should be removed, cleaned and if necessary again introduced.

We have never observed in our experience any untoward effects as the result of the metallic bulb or any ulceration or erosion produced by allowing the tube to remain in place over a long period of time. We have, therefore, not found it necessary to sew the bulb to the end of the rubber tube with catgut according to the Buckstein (2) method with the object of allowing the bulb to escape after the catgut has been absorbed.

Attention should be directed to the importance of insisting on frequent rinsing of the mouth with some antiseptic wash, as well as the chewing of gum to prevent oral infection while the tube is *in situ*.

INDICATIONS FOR DUODENAL ALIMENTATION.

While the indications for duodenal feeding are varied, Einhorn first called attention to its main applications in the treatment of gastric and duodenal ulcerations.

More recently (3) he has again advised its use in these affections. Of 315 cases reported by him the immediate results of treatment were satisfactory in all excepting four.

We have utilized this method of treatment for years in certain instances of ulcer, that is, the severe forms associated with intense nausea, vomiting, recurrent hemorrhage, moderate retention and especially in those cases which have not been relieved by the usual methods of treatment. It has been unusually successful in many instances and we are confident that it has been a lifesaving measure in a number of cases. Of special interest too, are those cases to which Einhorn (4) has called attention a few years ago: ulcers recurring after operations. These cases are not infrequent, and we believe, that before a second operation is contemplated, unless there should be pyloric obstruction or some other surgical complication, this method of treatment should be undertaken and in many instances, cure will be effected.

During the period of duodenal alimentation for ulceration, the patient should be required to remain in bed for the first week or ten days and during the remainder of the time should be allowed to be up for a part of the day. The feeding is usually kept up for about two weeks, but if necessary, it may be continued for a longer period of time. After the tube is withdrawn, nourishment is given by mouth for a short time in the form of liquids at two hour intervals to be followed finally with semisolids and solid food.

While the duodenal feeding is being maintained, the usual alkaline treatment may be continued by mouth. By means of duodenal feeding in cases of ulceration, the stomach is spared all irritation while healing ensues and at the same time, the required degree of nutrition is maintained. It is remarkable how quickly nausea, vomiting, pain and even hemorrhage subside under this character of treatment, but notwithstanding the immediate relief obtained, the duodenal alimentation should be continued at least for the entire stated period of from twelve to fourteen days.

While duodenal alimentation is extremely valuable in the treatment of some forms of ulceration of the stomach and duodenum, there are other conditions in which its use is equally beneficial. Of these, we wish especially to call attention to a rather large group of cases of a high degree of atony of the stomach, frequently associated with a maximum form of enteroptosis in which on account of the patient's inability to take food or at least an adequate quantity, malnutrition with great loss of flesh is produced. Einhorn (5) and C. R. Jones (6) have called attention especially to the beneficial effect resulting from duodenal alimentation in this group of cases.

In many instances of this affection, there is an associated marked anorexia and the patient may present an alarming appearance, not infrequently simulating carcinoma. According to our experience, duodenal alimentation brings about most beneficial results in this class of cases, with gain in flesh, strength and general nutrition, but must often be continued for over a period of at least three or four weeks. In most instances, after withdrawal of the tube, forced feeding may be inaugurated with further success.

Duodenal alimentation is of great value in the treatment of nervous anorexia and sitophobia. Both of these conditions due either from lack of appetite or fear of food, which may have extended over a considerable period of time, are followed frequently by much loss in weight as well as in strength. In not a few instances, due to an associated mental depression, the insistence and encouragement on the part of the physician to have the patient take food prove useless. In our experience in a number of patients affected with these disorders, the adipose tissues had almost completely vanished and even many of the muscles had been so largely atrophied that voluntary movements had become difficult and at times impossible. When a case has advanced to this stage, the danger of a fatal outcome is imminent.

Carnot and Libert (7) have recently reported a case of this character relieved by duodenal feeding. In many of these cases, duodenal alimentation is the only means by which a cure can be effected and often the associated mental disturbance is overcome due to a gain in weight and strength.

Another indication for the need of duodenal alimentation is when vomiting, which may be due to a variety of causes, occurs. Of these, nervous vomiting is the most frequent. Paddock (8) has recently advised this form of treatment in hyperemesis gravidarum. We have advised this procedure in several instances with favorable results. In all aggravated forms of nervous vomiting, it is wise to follow the plan noted above; that is, to introduce the tube at night after the patient has been placed under the influence of codeine or morphine, and in most instances, the tube will be found *in situ* on the following morning.

Finally, duodenal alimentation has proved exceedingly useful in the relief of nausea, vomiting and discomfort following certain surgical procedures. In persistent vomiting following anesthesia, which has extended over a period of a few days, it may be the only means of giving nourishment and preventing extreme exhaustion and weakness. After gastroenterostomies or other surgical procedures on the stomach, when persistent vomiting and discomfort have occurred sometime following operation, we agree with Einhorn (4) that there is no more efficient method of treatment, in many instances, than by means of duodenal alimentation.

A brief review of the following cases will illustrate the value of duodenal feeding:

Case. 1.—Persistent nausea and vomiting associated with gastric ulcer, extreme weakness, exhaustion and loss of flesh. Recovery under duodenal feeding. T. J., male, aged thirty-four years, had been affected with indigestion for the past ten years with periods of remission extending over three or four weeks at a time during which he was unable to take any form of food without discomfort. During the periods of indigestion, the patient complained of pains in the region of the stomach, occurring two hours after meals, which were, up to recently relieved, by the ingestion of food and alkalies; of acidity, nausea and occasionally vomiting. During the past three weeks, the symptoms had become greatly aggravated—pain, nausea and vomiting being persistent. The patient lost twenty-five pounds in weight, had become weak and easily exhausted. Physical examination revealed a much emaciated individual with heart and lungs normal; a tender area was elicited in the epigastrium. Gastric analysis revealed free hydrochloric acid 45, total acidity 68 (Ewald test meal). A röntgen ray examination revealed an ulcer at the pylorus with evidences of marked pylorospasm.

The usual Sippy ulcer management was instituted without avail, the patient vomiting nourishment as well as alkalies immediately. After three days' trial it was abandoned. The patient was then allowed to swallow the duodenal tube at night while resting and under the influence of codeine, and feeding instituted the following morning, after which no further discomfort was noted. He began to gain weight and strength within a week's time and after the removal of the tube in two weeks was able to take nourishment and complete his ulcer cure. After two years, the patient continues to remain perfectly well; a recent x ray examination revealed a perfectly normal condition of the stomach and duodenum.

Case II.—Marked atony and visceroptosis, indigestion, emaciation, weakness, inability to consume sufficient nourishment, no relief following rest cure. Complete relief by means of duodenal alimentation followed by rest cure. B. S., female, aged twenty-eight years, complained of indigestion for a period of four years, consisting of pressure, fullness, distention, constipation, and on account of distress produced by food was unable to take sufficient nourishment. The patient had gradually lost twenty pounds, weighing but seventy-eight pounds, and was extremely weak. Physical examination revealed an extremely emaciated individual presenting definite signs of a visceroptosis with marked gastrointestinal atony. An x ray examination confirmed the physical findings. A thorough rest cure had previously been given without avail. By means of duodenal feeding extending over a period of three weeks, the general nutrition was improved and the gastrointestinal symptoms disappeared. The patient was now placed under a complete rest cure with forced feedings and was discharged as well in nine weeks, having gained thirty-three pounds in weight.

Case III.—Nervous anorexia and vomiting, sitophobia, marked loss of weight and strength, mental depression. Complete recovery under duodenal feedings. K. O., female, aged forty-nine years, had been complaining of nervousness, loss of appetite, nausea and vomiting more or less for the past two years, following a shock due to a sudden death in her family. These symptoms gradually become intensified and in addition, there was present great fear of food, mental depression and loss of flesh (twenty-five pounds) and unwillingness to take nourishment. On physical examination, no abnormal conditions were revealed.

The gastric analysis and x ray examination of the gastrointestinal tract were essentially negative. No amount of persuasion or insistence could convince the patient of the necessity of consuming nourishment. She finally lapsed into a deplorable state of inanition and exhaustion. The patient was put to bed and after some difficulty the tube was introduced and feeding instituted, which was continued for a period of three weeks. The patient gradually improved in weight and strength and after removing the tube began to take nourishment normally and in the course of two months was apparently well both physically and mentally.

Case IV.—Gastric ulcer extending over a period of five years; gastroenterostomy; relief for six months; cured by means of duodenal feedings. S. M., male, aged fifty-four years, had been having symptoms of gastric ulceration, extending over a period of five years for which gastroenterostomy was performed. At operation a rather large ulcer was located near the pylorus, not producing any obstruction. The patient had complete relief for six months, when pain occurring several hours after food, symptoms of hyperacidity and nausea began to manifest themselves. An x ray examination revealed a large ulcer on the lesser curvature near the pylorus; there was no obstruction; the gastroenterostomy opening was apparently no longer functioning. A Sippy cure was undertaken without relief, the symptoms becoming aggravated. Operative intervention was advised but was refused by the patient.

Duodenal feeding was then undertaken and carried on for a period of two and one half weeks. The patient was promptly relieved and after removal of the tube has not been troubled from further distress. Careful feeding was continued for a few weeks longer, when the patient was discharged apparently well. An x ray examination made again of the stomach three months following the cure, revealed perfectly normal conditions.

CONCLUSION.

1. In duodenal alimentation a method of feeding has been established, which is not as a rule exceedingly uncomfortable to the patient when the technic is properly carried out, and which enables us to maintain nutrition when food cannot be taken in sufficient amounts in the normal way.

2. It is especially useful in the treatment of gastric and duodenal ulcer of a severe type associated with intense vomiting, nausea and recurrent hemorrhage and especially those forms which have resisted the usual methods of treatment. By means of this method of feeding, the stomach is spared all irritation while healing occurs and at the same time the requisite degree of nutrition is maintained.

3. Duodenal feeding is of great value in the treatment of cases of atony associated with a maximum degree of prolapse of the stomach and intestine, in which on account of the anorexia, the patient is unable to take an adequate amount of food and in which malnutrition with great loss of flesh is produced. This form of feeding is extremely helpful at times in overcoming nervous anorexia and sitophobia, which are often associated with much loss of flesh, strength and mental depression.

4. It is useful in relieving the vomiting, which

may be due to a variety of causes; i. e., nervous vomiting and the vomiting of pregnancy.

5. It is a valuable means of cure at times following surgical procedures on the stomach, when nausea, vomiting and discomfort have recurred sometime following operation.

6. Finally, in duodenal alimentation Einhorn has given us a most valuable method of feeding which in many instances has proved a life saving procedure and which must be classed as one of the most useful therapeutic measures developed in recent years.

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1013 North Charles Street.

Etiology of Gastroduodenal Ulcer

Why the Stomach Does Not Normally Digest Itself

By E. PALIER, M.D.,
New York.

In 1921 I published a preliminary communication on the subject of gastric ulcer. In this article I propose to deal with the matter in greater detail, the more so as my previous communication has apparently not been noticed in this country, either from lack of appreciation, or from sheer neglect and indifference. Many theories have been advanced in explanation of the subject in question, but unfortunately upon strict analysis they do not agree with well known and well established facts.

Many experimenters state that they have produced gastric ulcers experimentally in the lower animals, in one way or another, but their conclusions are at variance with what is known concerning the physiology and the pathology of the human alimentary canal and the occurrence of this affection in man. I would advise those who are interested in the subject of gastric ulcer to read over Welch's monograph (2) on this subject. Although written over a quarter of a century ago, it contains a wealth of information, interesting at least from a negative side.

The theory concerning gastric ulcer which has recently gained ground in this country and in England is the microbic theory. Now I am not a Christian Scientist or a chiropractor, two of the most dangerous cults of ignorant and swindling quackery that infest this country, and I am fully aware of the rôle played by microorganisms in the causation of diseases. But to incriminate microorganisms as an etiological factor in a disease when this factor does not exist is as reprehensible as its denial when it does exist.

Now to criticize the work of men who have a high standing in the profession, particularly when they occupy high positions in well endowed institutions, is a very ungrateful and at the same time disagreeable task. But it has to be done as a matter of veracity, not personality, before I expound my theory on the subject.

The microbic theory of the affection in question was advanced by Böttcher (3) as far back as 1874. In this country Turck (4) and Rosenow (5) have been its most ardent exponents and lay claim to having produced gastric ulcers experimentally by bacteria. Turck incriminates the colon bacillus, whereas Rosenow considers the streptococci as an etiological factor and according to him they make their entrance through the venous circulation.

A British pathologist asserts that he has found streptococci in the stomachs of cadavers with gastric ulcer, and he infers therefrom that the streptococci are the cause of the ulcers. This, of course, is too absurd to be discussed, as the stomach of a cadaver and that of a living being are entirely different.

Now, I have no reason and no right to doubt the veracity of Turck, Rosenow and other experimenters who state they have produced gastric ulcers by microorganisms or in any other way; but in answer to this I will quote again the following from Welch (6): "The most interesting of those experiments are those of Cohnheim and Dactwyler, who demonstrated that in one essential point all of these experimental ulcers differ from simple gastric ulcer in man—namely, in the readiness with which they heal. To this ready healing the gastric juice . . . seems to have offered no obstacle. . . .

"It appears from these experiments as well as from observation on man that it is more difficult to understand why ulcers of the stomach do not heal than it is to understand how they are produced."

Welch is perfectly right, as ulcer of the stomach is not a mere local infection, but it is a constitutional disturbance with local manifestations.

Now as for the microbic theory of gastric ulcer there can be no doubt in the minds of those who have had experience in gastrointestinal diseases that in the vast majority of cases there is either hyperchlorhydria or normal acidity in connection with this affection. Gastric ulcer with hypochlorhydria or total achlorhydria is the exception and not the rule. This latter condition occurs usually in old cases where a gastritis anacida has supervened to the ulcer. The fact is that we can seldom state with certainty the exact date of the onset of the ulcer.

Now in a number of works which I have published in English (7), French (8), and German (9) I have shown that in hyperchlorhydria and in normal acidity the only bacteria which are found in the stomach contents after a test meal or another light meal are yeast, fungi and a small bacterium which I named

Bacillus chlorhydrici (10). Under certain conditions one can find other microbes, but they are not constant. In subacidity or anacidity of the stomach any microbes can be found. The same holds good for gastric ulcer, which, as I have said before, is usually associated with hyperchlorhydria or normal acidity. But in order to determine this, it is not enough to examine a drop of gastric juice on a slide under a microscope, as is usually done by clinicians, but cultures and animal injections must be made. Furthermore, precautions must be taken in obtaining the gastric juice so as to prevent its contamination with the bacteria from the throat and mouth (11).

Turck asserts in one of his articles that the acidity of the stomach contents favors the growth and development of the colon bacilli. I regret to state that such a statement is utterly at variance with the facts of elementary bacteriology. It is true that a slight organic acidity does not hinder the growth of these microbes, but the degree of inorganic acidity of the stomach in normal acidity and especially in hyperchlorhydria is certainly not favorable for the growth of bacteria, except yeast and certain fungi which thrive best in an acid medium, particularly hydrochloric acid. In the laboratories, as is well known, the culture media for bacteria, including the colon bacilli group, are neutralized when they are prepared.

But I know that it is a difficult task to convince the reader who has not made bacteriological examinations of the gastric contents or who is not well versed in bacteriology in general, and I regret to have to say that very few indeed have a sound knowledge of bacteriology, though numerous are those who dabble in it and imagine they know it—of the correctness of my view in the laboratory domain. It is a question between my statement and the statement of others and the reader may be inclined to accept the view of others.

I will therefore leave the laboratory domain and take up some well known, well established, undoubted, pathological and clinical data concerning gastroduodenal ulcers, which cannot be questioned by anyone, except by a Christian Scientist or a chiropractor. These facts will speak for themselves and there can be no more question as to whose statement deserves more credence.

These are the facts:

1. The age of patients affected with gastric ulcer. This is a disease of adult life. There is no division of opinion on this point. A gastric or duodenal ulcer in infancy is considered a rarity, and some authors even doubt whether it ever occurs and consider the few reported cases not as true ulcers but as erosions (12). It would be superfluous for me to occupy space by quoting authorities in support of this view. Now if gastroduodenal ulcer were due to an infection by the colon bacilli or by cocci, why would children be so singularly exempt from the disease in question? We know as a fact that children are subject, in fact more so than adults, to infection by these microorganisms.

2. Systemic disturbances, such as fever, acceleration of pulse and other symptoms, are absent in gastric ulcer, except in certain complications. "It is an afebrile disease," as Welch expresses it. Now if it were due to a bacterial infection, to streptococci entering through the circulation, as stated by Rosenow, or to an infection by the colon bacilli, there would certainly be some systemic disturbances as a rule.

3. The pathological anatomy of gastric and duodenal ulcers. There are two types of ulcers—the round ulcer and the craterlike ulcer. I avoid the terms acute and chronic ulcer as being simply a vague, arbitrary, clinical definition. Now the round ulcer has sharply punched out borders, and a smooth bottom.[1] The craterlike ulcer defines itself—it is in the form of a crater, is indurated, sclerosed, and frequently it involves quite an extensive area, and it is often transformed into a carcinoma. These are facts again about which there is no divergence of opinion among pathologists.

Are these the characteristics of an infectious ulcer caused by colon bacilli, streptococci or other known bacteria? Certainly not. The latter is characterized by sinuous, granular, undermined borders, uneven spongy bottom, bathed in pus. Verily, I must say it is incomprehensible that the difference cannot be plainly discerned by all.

From these undisputed and indisputable clinical and pathological facts it ought to be seen that the microbic theory of gastric or duodenal ulcer is untenable. A theory that does not agree with well established facts must, of course, be rejected. We cannot build a theory on the experimental production of a phenomenon, if it is in disaccord with what we know of the same phenomenon when it spontaneously occurs in Nature. It is like stage thunder compared with real thunder.

What, then, is the cause of gastric and duodenal ulcers? The local cause is chemicomechanical, the underlying one is constitutional—namely, a disturbance of metabolism, and it can be defined as a constitutional disease with local manifestations.

In examining the urine in gastric troubles as a matter of routine, I have found that in cases of ulcer the urine contained an excess of alkaline earthy salts, and its reaction was less acid than normal, in some cases neutral or even slightly alkaline. Thus the reaction of the urine presented a contrast to the reaction of the gastric contents. These inorganic elements consist either of phosphates or carbonates or both. They are precipitated by heat and are redissolved by the addition of inorganic acids, in some cases with a rapid, energetic effervescence, and in other cases without effervescence or with a very slight one on the addition of acetic acid or the inorganic acids.

I also found an excess of those inorganic salts in the stomach contents in gastric ulcer. Their detection in the stomach contents, however, is not an easy matter and it is best done when some clear gastric juice is obtained on a fasting stomach or a few hours after a light meal. When there are remnants of food in the stomach contents, the matter becomes complicated and delicate. There is thus a general disturbance of metabolism, particularly of the inorganic salts, with an excess of it appearing in the stomach contents and in the urine.

Before I proceed, however, to expound the pathogenesis of the formation of gastroduodenal ulcers, I will briefly state the reason why the stomach and for that matter the intestines do not normally digest themselves, a question that has baffled physiologists from time immemorial. The explanation that the alkalinity of the blood neutralizes the acidity of the gastric juice does not hold good, of course, for the well known objection that it does not explain the reason why the nonacid intestinal contents do not digest the intestines; furthermore, by the fact that the foot of an animal introduced into its own stomach is digested. We know furthermore the unpleasant corrosion of the abdominal skin by the gastric juice following gastrostomy, so that surgeons lately perform this operation in such a way as to prevent this complication (13).

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[1] The French call it *coupé à l'emporti-pièce*. On the bottom there may be some débris and even bacteria; but they lodged there after the ulcer had been formed.

But the facts are these: As is well known, the stomach as well as the intestines, especially the small ones, are lined with numerous mucous cells covering the entire inner surface. Even mouths of the secreting peptic glands of the stomach are lined with mucous cells. For a long time I could not understand such an extravagance on the part of Nature of putting mucous glands in the digestive tract, since mucus has no digestive power.

At last the light came to my mind. The mucous membrane protects the stomach and intestines against autodigestion, because mucus is not digested or dissolved by the digestive juices of the alimentary canal, and the mucus secreted, as well as the mucous cells, owing to their contents of mucus and their vitality, shield the digestive tract against autodigestion.

If one should ask me why it is that mucus is not digested, I might ask him why the gastric juice does not act on starch and fats, or at least very slightly so, and why oil and water do not mix, and a million or more other questions like this. Since we do not know the riddle of the origin of the world, we shall always come to a question that we cannot answer.

That mucus is not digested or dissolved by the digestive juices can be easily seen in vitro and in vivo in pathological conditions of the alimentary canal. If we withdraw the stomach contents from a patient after a test meal, and this patient is suffering from catarrhal gastritis, the contents containing an abundance of mucus, and we plunge thereinto a strip of congo or Toepfer paper, the reaction may be almost negative, or there may be a change in the color of the paper only in a few spots. One might conclude therefrom that there is hypochlorhydria. If, however, we filter the gastric juice, or better still we let it stand for some time till the mucus separates, falling to the bottom, and we then try the reaction on congo paper, we may obtain a strongly positive reaction, unless it is a real case of subacid or anacid gastritis.

Not wishing to enter here into a discussion of gastritis, I will only say that when there is an abundance of mucus in the gastric contents, several test meal analyses are necessary before the condition can be pronounced as subacid or anacid gastritis. The fact is that the digestive juices of the alimentary canal and acids in general, such as are found in the stomach, do not act on mucus. The intestinal digestive juices, though slightly alkaline, are not, however, sufficiently alkaline to have any effect on the intestinal mucous membrane. Thus the mucous membrane protects the gastrointestinal tract as a shield against autodigestion. Again, an excess of mucus interferes with digestion.

Another factor though less important than the former, but still of great importance, is the peristalsis of the tract during digestion, so that the digestive juices are constantly repulsed from the walls of the canal. The secreting peptic and pancreatic cells do not digest themselves because the secretion is continuously expelled.

This, then, being the reason why the stomach does not normally digest itself, and it is undoubtedly the right reason, we can easily understand the pathogenesis of the gastroduodenal ulcer.[2]

When there is an accumulation or excess of inorganic salts in the mucous membrane of the stomach or the duodenum, first, the vitality of the mucous membrane is thereby impaired, and, secondly, the acid gastric juice acts as an energetic solvent on the inorganic salts and the impaired mucous cells. Once the breach is made, the process may continue till perforation of the gastric wall occurs. In the duodenum the same process takes place, for the ulcer in the duodenum occurs usually in that part of the duodenum where the digestive juice is still acid (14).

Furthermore, the addition of the digestive enzymes to a weak solution of hydrochloric acid, the way the latter is found in the stomach, enhances its solvent power of the inorganic salts. To this conclusion I came from my own researches, but subsequently on looking over Foster (15) I saw in it the following statement concerning the gastric juice: "The minerals that are soluble in free hydrochloric acid are for the most part dissolved, though there is a difference in this and in some respects between gastric juice and free hydrochloric acid diluted with water to the same degree of acidity as the juice, the presence of either pepsin or of other bodies apparently modifying the solvent action of the acid."

The modification consists in enhanced action. We all know that bones, when they are not very hard, are well digested by the human and animal stomach. We have seen how a cat swallows a whole mouse. My theory thus explains the frequent location of ulcer in the pylorus and the duodenum, as well as all other riddles in connection with gastrointestinal ulcers.

This affection, then, is a lithiasis or gravel of the stomach, acted upon by the acid digestive juices, causing the ulcer.

This will explain the hitherto inexplicable phenomena in connection with this disease. Lithiasis or gravel is a rare affection in children, therefore gastroduodenal ulcer is rare among them. Furthermore, the hydrochloric acidity among children is, on the average, much lower than in adults (16). In the aged, gastric ulcer is also rare, unless it dates from an earlier period. A person who up to sixty has not suffered from gravel is not likely to suffer from it afterwards. Besides, the gastric secretion in the aged is, on the average, less active than in younger people. It is second childhood.

Gastric ulcer is an afebrile affection, as Welch says, and as is well known, the same as is gravel of the kidneys, bladder, and other organs, except in certain complications. Its periodicity is also understood. As is well known, there are periods of remission in many cases of chronic ulcers, the acute attacks returning at intervals. The same occurs with gravel in other parts of the body.

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[2] Recently some authors have ascribed the nondigestibility of the stomach to an antipeptic ferment. But if this ferment were secreted in sufficient quantity it would naturally hinder digestion altogether. And what about the hydrochloric acid and also the yeast of the stomach, and the corroding stomach contents in general.

Furthermore, my theory will also explain the relief in most cases obtained by operations. The patient is almost immediately relieved after a gastrotomy, and the more of the pylorus eliminated the more successful will be the operation (17). If gastroduodenal ulcer were due to a microbic infection it is hard to comprehend how it gets well so soon after the operation. My theory answers this also. The activity of the acid gastric juice on the walls of the stomach, especially the pyloric region, is greatly diminished (18). On the other hand, an ulcer does sometimes occur lower down in the jejunum, after the operation, owing to the action of the acid gastric juice.

To say that the acid gastric juice favors the growth and development of bacteria like streptococci and colon bacilli, is simply baseless and absurd, as I stated above.

My theory will also explain the frequent resistance of the disease to treatment and the frequent relapses after apparent cures, because it is wrongly considered and treated as a mere local affection, with no attention to the deeper underlying cause.

In short, there is not a phenomenon with which I am acquainted in connection with the malady in question that is not explainable by my theory; this in itself entitles it to consideration.

I shall now briefly report a few cases as illustrations:

Case I.—Mr. K., baker, aged thirty, had been suffering from stomach trouble for a long time. There were periods of remission when the patient felt quite well, alternating with severe attacks of gastric pain and other symptoms. The patient came to me with a diagnosis of gastric ulcer ready made, and also brought me an x ray picture, with the diagnosis of gastric ulcer. The patient came for treatment and not for diagnosis. Ewald-Boas test meal: The gastric contents were poorly digested, contained mucus and blood, and showed a hypochlorhydria. The character of the gastric contents made me at first somewhat dubious about the correctness of the diagnosis of ulcer. But after several lavages of the stomach and a milk diet, a second test meal a few days later showed very little mucus and hyperchlorhydria.

This, by the way, proves the necessity of more than one gastric analysis.

Patient's urine: a specimen of the urine is heated in a test tube, and a precipitate occurs. A few drops of concentrated hydrochloric acid are added, strong effervescence takes place, and urine becomes clear. Another specimen of the urine is heated and a weak solution of hydrochloric acid with some pepsin and pancreatin is added; the urine clears up. A weak solution of hydrochloric acid alone dissolves precipitate imperfectly.

Stomach contents: I extract some stomach contents of patient on a fasting stomach. I obtain a few c. c. of clear fluid, very slightly acid. I heat it in a test tube: there is a precipitate formation which clears up on the addition of a solution of hydrochloric acid.

I must repeat here that the examination of the stomach contents for inorganic elements is a delicate matter. If there are food remnants or the acidity is strong, a complicated chemical analysis is required. I will also add that the contents of fasting stomachs of patients where ulcer can be positively excluded do not show any precipitate on heating, or if they do show it, it is not cleared up by the addition of hydrochloric acid.

In dealing with stomach contents it is necessary to use a finer method of analysis than heat and acid. But for the urine this is practically sufficient for clinical purposes. If one has the facilities for finer chemical analysis, so much the better, of course.

In some cases of gastric ulcer, the urine does not continuously show the presence of an excess of inorganic elements.

It disappears for a time and reappears again. Hence several examinations are necessary at intervals, if the result of the first examination is negative.

I will not occupy more space in reporting further cases.[3] I will say, however, that aside from the pathogenesis of gastroduodenal ulcer, I consider the presence or the absence of an excess of inorganic salts in the urine as an important and valuable diagnostic sign in gastric diseases, as valuable as is the presence or absence of tubercle bacilli in the sputum in the diagnosis of tuberculosis. Of course I am fully aware that there is such a thing as phosphaturia without gastric trouble. But in a case which I considered as simple phosphaturia and neurasthenia, and in which the gastric disturbances were very slight, I found, on introducing the stomach tube, a profusely bleeding ulcer. We know that gastric ulcer not infrequently runs a very latent course.

On the other hand, a case which presented some but not full evidence of ulcer, and I diagnosed it as such for a colleague who referred the case to me, and my diagnosis was corroborated by another gastrologist, a man with a large practice, after he had made an x ray examination of the patient, it turned out, at the operation, to be a case of gallstones. The urine in this case, however, was negative. Of course, kidney and bladder disorders must be excluded in these cases.

I sought to corroborate or disprove my findings by the experiences of other physicians who enjoy a vast clinical material. I applied to some, but I obtained no satisfactory answer. I then thought that the best source of information would be the Mayo Clinic at Rochester, Minn., as they have a vast material, and they also have the opportunity to verify the diagnosis by operation. Dr. Mayo kindly referred me to Dr. D. M. Berkman, who has charge of this matter. But he writes to me in answer: "I am very sorry to say that we have made no routine study of inorganic salts in the urine. We shall be interested in your article when it is published. . . ."

So I hope this article will arouse the interest of others and will evoke further research in this connection, and my findings and conclusions may be confirmed. It is very important, not only from an etiological and a diagnostic viewpoint, but from a therapeutic one as well.

151 East Eighty-ninth Street.

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[3] Reports of two other cases will appear in the author's reprints; also a full list of references.

Surgical Treatment of Gastric and Duodenal Ulcer*

By JOSEPH J. WELLS, M.D.,
New York.

In recent years there have been marked changes in certain operative procedures, especially as regards the surgery of the upper abdomen. This has been particularly noticeable in the evolution of gallbladder surgery. I need but mention this casually in passing to recall to your minds the controversies that raged when cholecystectomy was first advocated as the procedure of choice in dealing with cholecystitis or cholecystitis with cholelithiasis.

Let us now turn to the subject of this paper, namely, the surgical treatment of gastric and duodenal ulcer. No less radical and striking have been the changes in technical procedure in dealing with ulcer of the stomach.

It is not amiss to review here, briefly, the normal physiology of gastric digestion, and the disturbances that accompany the presence of an ulcer and its progression. The musculature of the gastrointestinal tract, from pharynx to anus, is made up of smooth muscle fibres, and it is a fact, noted in all forms of animal life, that contractions occur from above downward, followed by relaxation in definite orderly fashion. In other words, there is a certain rhythmicity in the movements of the gastrointestinal tract. The movements of the stomach have been studied by different investigators. The first really important contribution to this subject was made by Beaumont in his observations on Alexis St. Martin. In recent years the subject has been carefully studied by means of the x rays. It has been demonstrated by W. B. Cannon that the stomach consists of two physiologically distinct parts. The cardiac portion acts as a reservoir, and it is here that salivary digestion continues. No peristaltic waves are present in this portion of the stomach. In the pyloric portion active gastric digestion goes on. Peristaltic waves apparently are initiated in the middle of the stomach and pass on toward the pylorus. As the food passes from the pyloric portion into the intestines, tonic contraction of the fundus muscles squeezes food into the pyloric portion. As a contraction occurs, the food comes into intimate contact with the secreting surface within the narrowed muscular ring. The food escapes in small amounts on account of the intermittent opening of the pyloric sphincter.

Cannon's chemical theory regarding the opening and closing of the pyloric sphincter, has in recent years been attacked by the experiments of Carlson, Spencer, Meyer, Rehfuss, and Hawk. Carlson's experiments indicate that the pyloric sphincter opens for the ejection of chyme when reached by powerful advancing rings of contractions, and whenever the tonicity of the stomach musculature is greatly increased. Furthermore, Leo L. J. Hardt has shown that the emptying of the stomach is not interfered with in cases of achylia gastrica, since in none of these cases was retention present.

The stomach receives nerve fibres from the vagi and splanchnics, but its orderly movements are merely regulated through these extrinsic nerve fibres. The stomach is essentially an automatic organ, and it has been shown experimentally that gastric movements and gastric digestion may proceed normally after section of these extrinsic nerve fibres. Under normal conditions movements of the stomach are initiated through psychic stimuli, or reflexly through stimulation afforded by the presence of food in the mouth. in the presence of an ulcer we have the direct stimulation of food passing over an inflamed, ulcerated area. This probably gives rise to a reverse peristalsis, thus explaining the symptoms of nausea and vomiting, so regularly present in advanced ulcers of the stomach. In duodenal ulcers we find conditions are somewhat different. Irritation in this area will reflexly cause a spasm of the pyloric sphincter and thus lead to a delayed emptying of the stomach, but no reverse peristalsis occurs, since irritation here is in the duodenum and movements of the stomach remain unaffected. This conception of the mechanism of motor disturbances in gastric and duodenal ulcer would explain the reason for the rarity of vomiting in duodenal ulcer as compared to its frequent occurrence in gastric ulcer. When vomiting does occur in duodenal ulcer, it is probably due to overloading a dilated, atonic stomach.

The problem confronting the gastrointestinal surgeon, in dealing with gastric and duodenal ulcer, is, in the light of our present knowledge, still a difficult one for him to decide. He has the choice of several operative procedures. Shall he do a simple gastroenterostomy and take his chances of eighty-five per cent. cure—the consensus of statistics shows about eighty-five per cent. freedom from symptoms following gastroenterostomy in all types of ulcer of stomach and duodenum. In properly selected cases I believe that simple gastrojejunostomy should still be the operation of choice. In order to be able intelligently to pick the indication for gastroenterostomy, one should be well acquainted with the types of ulcer. For practical purposes, we divide ulcers of the stomach and duodenum into two main types. First, the soft superficial lesion, which does not penetrate further than the submucosa, and which, if followed, shows no tendency to malignant transformation. These are not always distinct types, but may overlap each other. The first type tends to heal, either spontaneously or under medical treatment. The second type, for some unknown reason, fails to heal, and is noted by its chronicity and tendency to progress.

In the first type of lesion, after persistent medical treatment has failed to relieve the symptoms, if repeated hemorrhages occur, or if there is present a marked stenosis of the pylorus, or other portion of the stomach producing hourglass stomach, then operation should be done, and in this type a simple gastroenterostomy, properly performed, will probably lead to a cure in the vast majority of cases. We find that the results of simple gastroenterostomy are especially good in cases of pyloric stenosis, or in cases where the ulcer is situated near the pylorus, without producing marked stenosis.

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*Read at the monthly conference of the surgical staff of the New York Post-Graduate Hospital and Medical School Service of Dr. Charles Gordon Heyd, March 21, 1923.

Some operators, notably Davis of Omaha, favor the Finney operation of pyloroplasty. One of its advantages is that the stomach and duodenal walls can be thoroughly explored and the ulcer excised. Finney and Friedenwald report one hundred cases with five deaths. Eighty-two cases followed for one year showed a percentage of 93.6 satisfactory results. The objection to the operation is that it is unsafe to perform in the presence of dense adhesions about the pyloric region, on account of the difficulties of the operation and because of the dangers of postoperative obstruction. It is also inadvisable to do this operation if much thickening of the pylorus exists.

The Horsley operation combines resection of the ulcer with pyloroplasty. It is a much simpler procedure than the Finney operation but many of the objections to the Finney operation exist in the Horsley operation. Eusterman says of pyloroplasty: My experience with the endresults of several hundred well executed pyloroplasties, many performed under favorable circumstances, has not been encouraging. Recurrence of ulcer in the suture line, adhesions to adjacent viscera, induration; contraction and narrowing, which provoke faulty pyloric mechanism and serious functional disturbances in the absence of adequate, obvious cause, are occasional sequelæ. At least fifteen per cent. of all pyloroplasties eventually prepare rich soil for successful gastroenterostomy.

In the second type of ulcer we have an entirely different problem to deal with. It is rather difficult to imagine that a simple gastroenterostomy can lead to a healing of these larger indurated and penetrating ulcers, with their massive adhesions to surrounding organs, especially pancreas and liver. While undoubtedly the mechanical relief afforded by the stoma may lead to amelioration or subsidence of the symptoms, still the relief thus afforded is at best only temporary, and we are almost certain to have a recurrence of the symptoms, with even greater severity than before the operative procedure was undertaken. Furthermore, we are leaving intact a lesion which is fraught with the ever constant danger of malignant transformation, variously estimated at between two and eighteen per cent. C. H. Mayo states that chronic ulcer is the most important factor to be considered in carcinoma of the stomach, as in more than forty per cent. there is a history of ulcer varying from many months to several years before the onset of cancer. We must also keep in mind that on the operating table it is often extremely difficult to differentiate between these hard penetrating lesions and a carcinoma, especially when the ulcer involves the lesser curvature or posterior wall. It seems to me that the only rational treatment in these types of cases is excision of the ulcer bearing area.

Having decided in favor of excision or resection, various methods present themselves.

1. One may excise the local area by means of a V shaped incision, and suture the resulting defect in gastric wall. This procedure should be combined with a gastroenterostomy to relieve certain distressing symptoms which may arise.

Excisions, which are often quite as difficult to perform as resections do not give as good results, especially if the ulcer is situated near the pylorus. Excision should therefore be limited to those ulcers which are situated too far away from the pylorus to lend themselves readily to a resection.

2. If the ulcer is situated near the middle segment of the stomach, we may do a mesogastric or socalled sleeve resection. Woolsey reports nine cases of mesogastric resection. There was no mortality in his group and while his late endresults were somewhat discouraging, he attributes the poor results to the constitutional background of the patients, as some of them were heavy drinkers, two were luetic, one was tuberculous, and one had marked arteriosclerosis.

3. Perforation of ulcer by means of cautery, followed by suture of defect—Balfour. The principle here is that healing will take place in a similar manner to the mechanism of healing following suture of a natural perforation. However, this is fallacious, for during the course of a slowly penetrating and perforating lesion, reparative processes have been going on. Its penetration is accompanied by the formation of protective adhesions, and when perforation does occur, complete recovery often follows simple suture.

4. Pylorectomy or subtotal gastrectomy. In properly selected cases there can be but little doubt that this is the best procedure. It is a fact, in dealing with ulcer of the stomach or duodenum, that the more radical we are, the better our endresults are likely to be. The type of pylorectomy or subtotal gastrectomy to be chosen I believe is a matter of choice with the individual operator. The basic principles are the same in whatever type of operation is undertaken. Undoubtedly, at first, our mortality will be somewhat higher in this type of operation, as against simple gastroenterostomy, but with the proper preparation of patients for operation and the increasing perfection and skill of the operator, the mortality should not be considerably higher than in simple gastroenterostomy. Furthermore, we have the assurance of probable cure and that we are not leaving behind a lesion, which, if not already malignant, may undergo malignant degeneration. Gastric resection undoubtedly should be the operation of choice where applicable, and the only contraindications should be when risk of operation is greatly increased by general or local condition of the patient. Another point, worthy of note, is that if the operation is done under local anesthesia, the postoperative course is extremely smooth, and in the majority of cases the condition of the patient following operation is markedly superior to that following general anesthesia.

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Oxalic Acid Production in the Colon as a Factor in Disease Causation

A Preliminary Report

By CLARENCE W. LIEB, A.M., M.D.,
New York.

The biochemical importance of the various sugars reaching the lower bowel is becoming more and more the subject of intensive laboratory and clinical study. Inasmuch as the transformation of histamine from histadine by the colon bacillus is only possible in the presence of an easily available source of carbon such as saccharose or glucose (1) and as histamine is formed only in an acid medium the importance of the sugars in the production of toxins in the intestine is at once apparent.

Neuberg (2) has shown that nearly all reducing substances may play the part of activators in the fermentation of yeast. Von Wassermann and Ficken (3) examined the effect of such activating bodies on the production of toxic substances by intestinal bacteria and could demonstrate a very toxic substance for the mouse in a culture of the Fraenkel bacillus, which is widespread in the intestine, when placed in a two per cent. glucose bouillon. The production of this toxic substance was greatly increased in this instance. The addition of activators increases the toxicity by thirty to forty per cent. The toxic substance has a strikingly critical threshold value. The filtrate is much more toxic than the complete culture. Filtration apparently produces a biophysical solution of the smallest protoplasm particles which are especially effective.

The addition of small quantities of this filtrate to a complete culture acts as an activator similar to the d'Herelle phenomenon. The effect of the activators may be determined by all fermentation excitants and with the colon bacillus. It does not seem to be limited to fermentation quantities but the presence of carbohydrates is always necessary.

The authors assume that similar processes are at the base of intestinal autointoxication. It is not a matter of new bacteriological infection but of activation and formation of toxins. This would explain the normal bacteriological findings and the favorable effect of mechanical emptying of the intestine in contrast to the failure with intestinal disinfection. The toxin with the anaphylatoxin without incubation and which is increased by activation reminds one of the anaphylactic group of diseases in which toxic stimuli are the active cause—vagotonia, exudative diathesis, and arthritism, in which the products of breaking down of administered molecules of albumin play an important part.

Hiss and Zinsser in their latest edition state that "the variety of acids formed by bacteria depends largely upon the nutrient medium. The acids most commonly resulting from bacterial growth are lactic, acetic, oxalic, formic and hippuric acids." Oxalic acid heads this list in toxicity. Judging from the frequency with which the writer found it in human feces by a method elaborated by Connellan, its clinical significance is noteworthy. Where positive oxalic acid reactions have been obtained, the stool has invariably been that of a person with chronically deranged metabolism.

The older writers lay great stress upon the finding of large amounts of oxalate crystals in the urine. Among the symptoms which they mention as the result of oxaluria are headaches, lassitude, mental depression, digestive disturbances, loss of appetite, flatulence and constipation.

Baldwin (4) has been able to develop an experimental oxaluria in animals by feeding large quantities of glucose together with meat. He states that the oxalic acid thus formed is produced by the fermentation of carbohydrates in the stomach. We now know that the latter statement is fallacious and that the oxalic acid thus formed was not formed in the stomach but was the result of bacterial action on the glucose which reached the colon. In like manner can be explained the large quantities of oxalic acid which Naunyn found in the urines of diabetics and obese individuals. In 1879, however, Kobert and Kürsner (5) announced that in animals oxalic acid may produce glycosuria; this has since been confirmed, and Sarganeck has noted the symptom in human poisoning, so that it is probably a constant phenomenon.

TOXIC ACTION.

Oxalic acid and its salts, e. g., salt of sorrel, are quite toxic substances. Oxalic acid is very abundant in the vegetable kingdom in the form of its acid salt, KHC_2O_4 and calcium salt. A number of commonly used articles of diet, such as spinach, rhubarb, figs, cocoa, tea, coffee, plums, tomatoes, strawberries and gooseberries are rich in salts of oxalic acid. Oxalic acid is normally found in the urine, two to six mg. being excreted in the course of the day. An important difference between mineral acids and oxalic acid is the toxicity of the salts of the latter. Not only do free oxalic acid and its acid potassium salt, salt of sorrel, show poisonous properties but even very dilute solutions of neutral sodium oxalate, $Na_2C_2O_2$, act in the same way.

A striking thing about the urine excreted during oxalic acid poisoning is the abundant deposition of crystallized calcium oxalate. The local action upon the kidneys is caused by the clogging of the injured urinary tubules by deposits of calcium oxalate. Attention was first called to oxalic acid as a poison in 1814 by its certainty and rapidity for suicidal purposes. Death has been produced by it in ten minutes. The minimum fatal dose recorded is one dram.

Oxalic acid acts on the economy in two principal ways, according as its solution is concentrated or dilute. When concentrated it causes great pain, followed by violent retching, then sudden dullness, languor, and great debility, death without struggle; when dissolved in twenty times its weight of water, it causes death by acting on the brain, spinal marrow, and heart. It should be noted that the acid, even in weak solution, always exercises a corroding or softening power on the animal tissues. After death from oxalic acid the mucous membrance of the alimentary canal is either soft and pultaceous or entirely destroyed. The stomach usually contains a dark fluid, resembling coffee grounds, consisting chiefly of altered blood. In a few cases no morbid appearances have been discovered.

Autenrieth (6) and Warren have stated that, "On account of the ease with which the organism takes up oxalic acid and its alkali salts, the action of the absorbed poison is rapid. The effects caused by its presence may be attributed to the fact that this acid removes in part from organs, as the heart, and from body fluids (blood) the calcium they require for their life processes, converting it in part into insoluble calcium oxalate. Oxalates diminish the coagulating power as well as the alkalinity of blood. On the other hand they increase the quantity of sugar in the blood. Owing to withdrawal of calcium from the heart, that organ is weakened and finally paralyzed. The quantity of oxalic acid in the liver is noticeably large."

Previously all oxalic acid was made from saccharose or glucose by treatment with nitric acid, one pound of the sugar producing one and a quarter pounds of oxalic acid (7). Hiss and Zinsser (8) state, however, that it can be produced by bacterial action on the sugars.

The foregoing facts may be summarized as follows:

1. Oxalic acid is produced in the colon by the bacterial decomposition of sugars.
2. It is one of the most readily absorbed of the poisons.
3. It produces definite toxic symptoms even in small amounts.
4. It produces calcium deficiency in the circulating blood.
5. It increases the quantity of sugar in the blood.

DIETETIC TREATMENT.

We have been using a dietary containing the minimum amount of cellulose so that as little sugar as possible is mechanically carried into the lower bowel. We believe that the benefits of the smooth diet in colonic diseases are due in large part to a quantitative reduction of activating sugars reaching the lower bowel. A smooth, low cellulose diet mechanically facilitates starch and sugar digestion and likewise lessens peristaltic activity thereby prolonging the absorptive period. We believe that colonic passivity or immobilization produced, in so far as that is possible, by a low or absent residue diet, is just as important in curing colonic pathology as is local rest in other conditions such as an infected lung or a broken leg. Doubtless some of the benefits of a starvation cure are due to intestinal rest and an absence of activating sugars in the colon. Chronic intestinal invalids are notoriously improved for the time by barium meals and enemas. It is very probable that intestinal stasis is a protective mechanism, an effort on Nature's part to produce local rest in the presence of inflammation. I am at the present time experimenting with a residueless diet containing butter, sugars, gelatine, and tryptophan, raw vegetable and fruit juices, in the treatment of extreme colitis and the results to date look very promising.

Recognition must be given to the fact that the sugars as taken in the food do not exist as such on reaching the colon after digestive metamorphosis. This is shown in the following synopsis and is an important guide in devising our dietary menus (9).

Starch.—Constitutes over fifty per cent. of the solid matter of cereal grains and a larger proportion of the total solids of potatoes, bananas, etc. In processes of digestion (especially when cooked) starch is changed to maltose and the latter to glucose.

Glucose (dextrose).—Occurs in large amounts in most fruit and plant juices. Almost all carbohydrates yield glucose when split by digestive ferments. It reaches the large intestine as glucose.

Saccharose (sucrose—cane sugar).—Occurs commonly in the vegetable kingdom. When digested, it is changed into equal parts of glucose and levulose.

Levulose (fructose).—Occurs with glucose in fruits, honey and plant juices. Reaches large intestine as levulose.

Maltose.—Occurs in malted or germinated grains. Large amounts formed by digestion of starch by saliva or pancreatic juice and in turn into glucose.

Lactose (milk sugar).—Occurs in milk. In the intestine lactose is digested into equal parts of glucose and galactose.

COLONIC THERAPY.

This has consisted of daily lavage of one half of one per cent. sodium carbonate (monohydrated) solution until the colon is thoroughly empty. One to two litres of a half of one per cent. calcium lactate solution is then slowly run into the colon and immediately evacuated. The sodium carbonate is used because of its lytic action on all gram negative bacteria, some types of which by their action on certain sugars produce oxalic acid. The calcium combines with the oxalic acid forming calcium oxalate thus preventing its absorption. Some calcium is undoubtedly absorbed through the intestinal mucosa and thereby increases the calcium reserve of the blood.

ORAL THERAPY.

After trying the various calcium preparations we favor the lactate. Four grams can be given daily for a long period of time without upsetting the stomach.

INTRAVENOUS THERAPY.

We have had experience with but two preparations for intravenous use, namely, calcium chloride (ten c.c. of a ten per cent. solution) and afenil (calcium carbimide with urea). We have given ten c.c. of the latter daily for six successive days and find it safe and dependable.

One hundred and sixty-six stools have been examined for oxalic acid. These were from patients all of whom were suffering from some chronic affection. Ninety-six of these were positive for oxalic acid. An analysis of these cases will be left to a later report. A few typical case reports are herein appended.

Case I.—L. M., female, aged twenty-three. A diagnosis of toxic psychosis had been made. The patient had been depressed, uncommunicative and negative for four months. Physical examination was negative except for a proctoscopic examination which showed a markedly hyperemic mucosa and considerable mucus. An examination of the feces showed extra large quantities of mucus and a high oxalic acid content. Blood coagulation time was twelve minutes. After two weeks' intensive treatment complete recovery ensued.

Case II.—F. T., female, aged thirty-eight, was referred with a diagnosis of urticaria, of seven years' standing. All treatment heretofore had been unavailing. Physical examination was negative except for marked *taché cérébrale* and urticarial blotches over the face, abdomen and legs. Feces examination showed highly acid stool, high histamine, and oxalic acid. Within three days after treatment was started the urticaria had disappeared and there was no reappearance after four months. The patient has followed dietary instructions as herein outlined very faithfully and takes a course of calcium lactate every third week.

Case III.—E. L., male, aged thirty-seven; diagnosis, chronic migraine. The patient had had weekly attacks for fifteen years with the exception of a month or two in the summer when he was exercising vigorously. There was chronic constipation of the spastic type. Physical examination was negative except for a blood pressure of 145/90. Feces examination showed a highly acid stool with much mucus and heavy reactions for oxalic acid. The patient has had but one attack since starting treatment four months ago. The blood pressure is 130/85 and the bowels have been perfectly regular. Two months after intensive treatment the stool showed no oxalic acid.

Case V.—B. R., female, aged forty-six; diagnosis, epilepsy of two years' duration, attacks occurring at weekly intervals or even oftener. Physical examination was negative. Feces showed high acid reaction, quantities of intestinal sand (largely calcium) and much free oxalic acid. Patient has had no attacks for six months since being placed on the calcium, dietetic and colonic regimen herein described.

Case VI.—S. G., female, aged twenty-eight; primipara, suffering from pernicious vomiting of pregnancy. Patient had had continuous nausea and vomiting for two months and was exhausted at time treatment was started. Symptoms were completely relieved after the second day's treatment. After one week the calcium medication by mouth, vein and colon was stopped. The symptoms, however, recurred after eighteen hours but subsided directly the calcium regimen was again instituted. After three weeks' intensive treatment the patient was discharged and had had no recurrence to date. She is now in her seventh month of pregnancy.

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366 Madison Avenue.

Report of Case IV will appear in author's reprints.

Diagnosis of Acute Surgical Diseases of Upper Abdomen*

By RALPH F. WARD, M.D., F.A.C.S.,
New York,
Attending Surgeon, Metropolitan Hospital, Department of Public Welfare, City of New York.

Acute surgical diseases of organs of the upper abdomen call our attention principally to the stomach and duodenum, the gallbladder and ducts, and the pancreas. Because of the close anatomical relationship of these organs, and the great severity and suddenness of attack to which they are subject, and also because many or most cases wherein these organs are acutely affected are not seen by the physician or the surgeon at their beginning, it is often difficult, because of a spreading peritonitis, to differentiate exactly which organ has been primarily affected. Here a most careful, painstaking history, which may be difficult to obtain in its entirety from the suffering patient, but which may be enlarged upon by relatives or friends, together with a thorough physical examination, is of the greatest importance, and if time permits, laboratory and x ray examinations should be undertaken.

These acute conditions portray a picture which is tragic, and some surgeons recognizing the need of immediate operation have been in the habit of making the diagnosis upon the operating table. Granted that this sometimes has to be done, because of obscurity of definite localizing symptoms, nevertheless, we should by all available means endeavor to clarify the diagnosis before operation, and by so doing add to our knowledge and diagnostic acumen.

In perforations of gastric or duodenal ulcers, there are two symptoms always present, pain and rigidity. The pain is sudden, violent, agonizing, and prostrating. It may appear after eating or after exertion, and may be difficult for the patient to locate exactly, but usually is in the epigastrium about half way between the ensiform and umbilicus, but may be any place between the two. Later on it may radiate to the back, or as the peritonitis spreads, may reach the right iliac fossa. It is, however, of high origin traveling downward, and is differentiated from the pain in pelvic or appendiceal inflammations or rupture which begin low down and travel upward.

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*Read before the West Side Clinical Society of New York, April 13, 1922.

The rigidity of the abdominal muscles in perforations of the stomach or duodenum, has many times been described as boardlike, and sometimes is so great that there seems to be no difference between thoracic and upper abdominal resistance to palpation. As nature endeavors to protect the inflamed or ruptured appendix by splinting it with muscular rigidity in the right lower quadrant, so perforations in the upper abdomen are splinted by fixation of the diaphragm and rigidity of the muscles of the upper portion of the abdomen.

According to Muller and Ravdin (1) seventy-four per cent. of perforations will give a history of gastric ulcers which are characteristic, as chronic pain bearing some relation to the ingestion of food, and which in the great proportion of cases is relieved by taking food.

Not long since, I operated upon a patient who had a perforation of the stomach, who gave a history of having had dyspepsia for twenty years, for the relief of which he had taken bicarbonate of soda, two or three hours after each meal for that length of time. Operation was performed six hours after perforation. He made an uneventful recovery. It is the remaining twenty-six per cent. of gastric perforations, where patients never have had any pain or gastric symptoms until the pain of perforation, that tax our diagnostic ability, for they come like a flash of lightning out of a clear sky, striking down a person who was previously in apparently perfect health.

Perforations of the stomach or duodenum give us, aside from the history, the pain of perforation; rigidity of the upper abdomen of boardlike quality; splinting of the diaphragm; vomiting, retching or both; subnormal temperature at first, rising later; increase in pulse and respiration; greatest sensitiveness to palpation in the midepigastrium, and pallor and shock.

A history of previous trouble relative to the gallbladder is usual before an acute attack of cholecystitis, cholelithiasis, empyema, gangrene or perforation. It is noteworthy that a history of pain in the upper right quadrant due to gallbladder disease usually comes on after eating a hearty meal, and is not, as in gastric ulcer history, relieved by taking food. It is relieved by vomiting, belching gas, or by a hypodermic injection of morphine and atropine. In an acute attack, the pain is to the right of the midline in the epigastrium or directly over the gallbladder, radiates through to the back, and under the right shoulder blade, with greatest tenderness to palpation between gallbladder and the midline. There is upper abdominal rigidity most marked on the right side. There is increase in pulse and respiration, and elevation of temperature. If we add to these symptoms a state of icterus, and severe pain on deep palpation a little to the left as well as to the right of the midline, we have a picture of stone or obstruction in the common duct.

Unfortunately x ray examination of gallbladders and ducts for the diagnosis of gallstones have not reached the perfection attained in many other lines, and while some experts claim as high as fifty per cent. finds, I have repeatedly removed choleliths where the x ray has failed to show any shadow. Some of these stones have been the size of an egg. Unless there are some lime salts present with the cholesterin, they do not as a rule show up under the fluoroscope or on the x ray plate. The rapid strides being made in this direction may in the near future give more trustworthy help from the radiographer. At present a negative x ray picture must not deter us from operating in the presence of well marked clinical signs.

It must be remembered also that acute suppurative or gangrenous appendicitis of retrocecal placement may give almost the same picture as that of gallbladder disease, but there will not be splinting of the diaphragm. Again, both gallbladder and appendix may be affected at the same time.

To quote from W. J. Mayo (2): "There is a curious relationship between acute perforations of the gallbladder into the free peritoneal cavity and acute perforative appendicitis. I have seen a number of simultaneous perforations of the gallbladder and appendix. In these cases the gallbladder has usually contained stones, the pus has had a strong colon odor and its bacterial flora has been similar to that in the pus escaping from the appendix. The first case of this kind under my observation resulted most unfortunately, as the condition of the appendix escaped attention. The gallbladder had perforated and a beginning septic peritonitis with a good deal of turbid fluid was present. The patient had been ill with acute symptoms for more than seventy-two hours. I therefore removed the stones as quickly as possible, drained the gallbladder, and evacuated the fluid contents of the abdomen, made a rapid toilet, and inserted drains. The patient died forty-eight hours later, when I found that there had been a perforation of the appendix, with an abscess imperfectly walled off, into which a fecal concretion had escaped. Had I discovered the true condition of the appendix at the time of operation there is little doubt that the patient would have recovered. Since that time, I have always examined the appendix in cases of acute perforations of the gallbladder, and in a number of instances have seen similar conditions. It would appear that, in such cases, the infection started in the appendix and was carried through the portal circulation to the gallbladder already infected and containing stones."

An experience of my own antedates the publication of the quotation from Dr. Mayo (2). In 1912, while operating in a case of acute suppurative cholecystitis, I found the appendix also involved in an acute, virulent inflammation with beginning gangrene. Since then I have removed the appendix in every gallbladder operation undertaken, whether it seemed to be pathological or not. It must be conceded that we can not ignore the appendix, and its influence upon acute surgical diseases of the upper abdomen.

In acute suppurative or gangrenous pancreatitis, we have the most severe, fulminating type of surgical disease that occurs in the abdominal cavity. Because of the close anatomical relationship of the gallbladder and ducts to those of the pancreas, through the diverticulum of Vater, and the ducts of Wirsung and Santorini, the head of the pancreas may become infected, where there is damming up, due to stones, infection or pressure at the papilla of Vater. Not only through the ducts, but as Deaver in his paper on pancreatic lymphangitis says—"The gallbladder, bile ducts, pyloric region of the intestines and the second part of the duodenum, through their efferent lymph channels, are placed in intimate relation to the head of the pancreas, and it is the head of the pancreas that is most frequently involved in pancreatitis associated with other upper abdominal disease. The course of infection has time and again been observed at the operating table in gallbladder disease."

C. H. Mayo (4) says: "The lymph drainage from the head of the pancreas passes through the lymph glands of the common and hepatic ducts. A cholecystitis causing great enlargement of these glands can produce pressure and jaundice or a lymph borne infection of the pancreas."

Thus it can be seen how the head of the pancreas may be easily vulnerable to attack by infection because of its relationship, through lymphatic channels, as well as through its duct system. It also shows that a history of previous gallbladder trouble may be expected in many cases of acute pancreatitis.

The pain in acute pancreatitis is sudden, intense, and agonizing. It is in the midline, nearer the ensiform than the umbilicus. There is at first vomiting and retching. The patient is in shock and collapse, with a rapid, weak, pulse. He will be bathed in a profuse perspiration, and his face will be of a deathly pallor, or will be cyanotic. The temperature at first is subnormal, but rapidly rises. There is upper abdominal rigidity, often accompanied by retraction at or below the level of the umbilicus. The symptoms are more severe, and the shock more intense than in stomach perforation or that of the gallbladder. Fortunately these cases are not common. When one has seen a patient in this condition it will produce a mental picture never to be forgotten.

The treatment of these acute diseases is strictly surgical, and that without delay. Every hour without operation jeopardizes the life of the patient, while if operated upon within the first few hours, his chances are good. You might consider that the patient is too weak to stand the anesthetic, but on the contrary it lessens the shock, relaxes the diaphragm, and under its influence the pulse and respiration are markedly improved.

Without going into the surgical technic, may I say that the Mayo incision, or one I have used, from the ensiform curved to the outer edge of the right rectus and then straight down, gives the required room for thorough exploration of the stomach and duodenum, the gallbladder and ducts, the pancreas, and the appendix, all of which must be investigated, because of their intimate interrelationship in acute diseases of the upper abdomen.

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895 West End Avenue.

Upper Abdominal Disease in Relation to Insurance Risks*

By MOSES BEHREND, M.D.,
Philadelphia.

The paramount question for medical examiners to decide is whether the prospect for insurance is a better risk before or after operation. This depends in a measure from what viewpoint you are considering your applicant. If you are an internist your opinion may differ widely from that of the surgeon. I believe that the surgeon is in a better position to decide whether the man who presents himself for insurance is a good risk or not. The surgeon sees the lesion, the medical man perhaps guesses at its existence. If the physician is a good medical surgeon, that is, one who recognizes the importance of calling a surgeon, a better opinion is forthcoming from this type of physician. Again, a physician whose opinion can be depended upon is the one who is always present when the operation is performed on his patient. In a given case there may be as many opinions as there are physicians in this room but the most important question is to give an opinion based on facts and experience. Such experience can only be acquired by long practice.

As we shall devote our attention mainly to the upper abdominal conditions a question of importance is the frequency of the occurrence of cancer grafted on a lesion, be that a gastric or a duodenal ulcer, gallstones, pancreatitis or some other chronic irritant which predisposes to malignancy. The estimates of different observers vary greatly, some putting the cancer incidence at five per cent. while others place it at over sixty per cent. in cases of ulcer of the stomach. I have never seen a case of carcinoma of the duodenum following a duodenal ulcer. This is an exceedingly rare complication. There is no question in my mind that gastric ulcers predispose to cancer of the stomach. While it is often difficult at operation to decide whether a lesion is definitely a cancer or not there are undoubtedly a great many malignant cases in this group. The busy surgeon encounters many cases which could be used to illustrate this point but the history of the following case will suffice.

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CASE I.—The patient, who was referred by Dr. V. A. Loeb, had suffered for many years from indigestion. He lost weight, had almost continual pain and no appetite. At operation an ulcer was found on the posterior wall of the stomach which resembled a cancerous condition. After a rather difficult operation the diseased structures were excised and the edges of the stomach were reunited. The patient made a good recovery. Much to our surprise the histological report showed benign ulcer of the stomach.

As medical examiners you are not so much interested in the applicant who has cancer at the time of the examination because these cases are readily diagnosed and rejected. This is true in a large majority of the patients examined. Occasionally the human error will creep in. Infallibility in diagnosis does not exist.

GASTRIC OR DUODENAL ULCER.

The most interesting and the most important point for you to decide is whether these applicants with benign conditions are better risks after operation than before. My feeling is that if you as examiners possess absolute knowledge of the existence of a gastric or duodenal ulcer, especially a gastric ulcer, the applicant ought to be rejected or given an advanced rating. The reason is that the complications of perforation or hemorrhage are serious and may arise at any time to cause death. We have as an example a case of a man eighteen years old who was admitted to the Jewish Hospital with the history of having had hematemesis on several occasions. On account of this history the operation was scheduled for the following morning. During the night, however, he had a concealed hemorrhage which was not recognized by the nurse. Before any remedial measures could be applied the patient died.

HEMORRHAGE AND PERFORATION.

Hemorrhage and perforation occur in about five per cent. of cases. Everyone recognizes the seriousness of perforation of an ulcer. Those who have witnessed operations for gastric or duodenal ulcers will note the fact that it is impossible to cure a hard nonresistant ulcer by medical means. These are the types that degenerate into malignant tumors. At Boston in conversation with one of the prominent surgeons of Chicago we asked his opinion of the result of Sippy treatment. His answer was that four out of every five patients come to operation. Two thirds of this particular surgeon's work consists of gastric surgery. I would therefore consider a patient undergoing the Sippy treatment as only a fair risk while a patient who has been operated upon is a first class risk. The conditions under which this opinion is given is that it must have been performed by a surgeon of reputation and that the ulcer must have been removed by excision.

The question might be asked is there not danger of a gastrojejunal ulcer following operation where a gastroenterostomy has been performed. Yes, but the incidence of this complication is less than one per cent. and is therefore a negligible factor. It must be borne in mind that all the complications of a primary ulcer may be found in a marginal ulcer. Secondary operations are as successful as the primary; the results are gratifying, while the health of these individuals is usually better than after the primary operation. Notwithstanding the possibility of a second recurrence the patient is often a better risk after this operation than after the first. Several examples to illustrate this point could be given but it will suffice to refer to two cases admitted to the Mt. Sinai Hospital. These cases had primary operations, both had gastroenterostomies performed and then marginal ulcers developed, the one having continuous pain, the other hemorrhages which almost cost her life. In the first case the gastroenterostomy was excised, the openings in the stomach and duodenum were enclosed, the food was allowed to pass from the stomach by means of the pylorus. The second case was a desperate one on account of frequent hematemesis. The patient's hemoglobin was between twenty-five and thirty per cent. She was pale, apathetic and emaciated and not always cognizant of her surroundings. A few hours before operation she was transfused with whole blood. The ulcer was excised and the gastroenterostomy was renewed. Both these patients made a fine recovery, the former being able to eat foods which she was unable to enjoy before; the latter regained her health wonderfully, the hemoglobin before she left the hospital was seventy per cent. These two cases are better risks now than they were before the second operation.

GALLBLADDER DISEASE.

Another upper abdominal condition that must be reckoned with is gallbladder disease. While gallbladder disease is not nearly so serious a condition as ulcers of the stomach and duodenum in relation to insurance risks still the cancer incidence following cholelithiasis especially must be borne in mind. Cancer of the gallbladder follows in about five per cent. of cases. The percentage seems greater at times considering the large number of malignant cases that one encounters in series. It is a well known fact that about twenty per cent. of the cases autopsied have latent gallstones. Perforation of the gallbladder is a rare affection, occurring in less than one per cent. of cases. The symptoms of this accident are similar to those of ruptured gastric or duodenal ulcer.

Probably gallbladder disease does not interest the medical insurance examiner as much as gastric and duodenal ulcer on account of the comparative infrequency of gallbladder disease in men as compared to women, provided the same conditions pertain now as formerly when women were not solicited to carry insurance on account of them being poorer risks than men.

When one considers gallbladder disease in relation to insurance risks there are three classes that present themselves. 1. Those with frank gallstone attacks. 2. Those who have gastric symptoms related to gallbladder disease. 3. The latent cases of cholelithiasis. In those who have had gallstone colic there is no question that they are better risks after operation than before on account of the danger of the complications and sequelæ such as cancer, rupture of the gallbladder, stone in the common duct and acute pancreatitis. In the second class of applicants for insurance we are compelled to make a differential diagnosis between some gastric or duodenal lesion and gallbladder disease. This is at times difficult without resorting to all the laboratory aids. Granted that it is not your province as medical examiners to apply these helps in diagnosis it would be safer from your viewpoint to rate these individuals as fair risks only. In the third class of prospects there is no means to determine the existence of gallstones so long as they are not symptomatic. It makes little material difference because at autopsy latent gallstones are never a cause of death.

JAUNDICE.

As a matter of argument it would not be advisable to accept persons who are jaundiced. Jaundice is not always present in gallbladder disease, occurring in fifteen per cent. of cases. When jaundice is only a temporary condition following an attack of acute cholelithiasis not much importance need be attached to it from the medical aspect, but if it persists, as in cases where the common duct is obstructed by a stone, chronic pancreatitis or malignancy in the pancreas or some portion of the gallbladder passageways we have a real problem. In those having a temporary cholangitis medical treatment may suffice unless gallstones are present when a cholecystectomy by the open method should be performed. At the time of operation the common duct must always be examined to eliminate a stone. In benign cases in which a cholecystectomy has been performed the prospect may be classed as a good risk.

STONE IN THE KIDNEY.

The destructive effects at times of stone in the kidney renders this condition an insurance risk of no small importance. History records many kidneys that have been rendered functionless by a stone too large to descend the ureter. The functionless kidney is not always recognized immediately until the continuous obstruction to the flow of urine has caused considerable damming back of urine, a consequent abscess and the entire destruction of the kidney parenchyma. This may take a long time to accomplish but eventually the results of the colic will be felt. Many patients pass small stones without any effect on kidney secretion. There are also many cases of latent stones that do not give any trouble at all but which are found accidentally on x ray examination. Stones in the kidney predispose to cancer of this organ by acting as a persistent trauma. In two months we operated on three patients with cancer of the kidney superinduced by renal lithiasis. When stones exist in both kidneys or colic has attacked both kidneys we are facing a real problem. When both kidneys harbor stones the largest and the most obstructive should be removed first. As insurance risks these cases should be rated high. Even if the stones have been removed enough damage may have been inflicted to render the patients poor risks.

It is remarkable how healthy patients are who have had one kidney removed. My records show many patients in perfect health as a result of a nephrectomy. They are well because the kidney removed was not functionating at all, the work having been performed by the healthy kidney. My feeling is that if these persons desire insurance they should be given an advanced rating.

It is evident that the subjects of tuberculosis of the kidney are not insurable. Here, too, one is surprised how well these patients remain after the diseased kidney has been removed.

Hematuria of the kidney nontuberculous and not due to stone is usually caused by a hypernephroma, which means a sarcoma in the majority of the cases. This is a curable affection if reached early and a nephrectomy performed.

GASTROPTOSIS.

Gastroptosis may simulate any of the benign intraabdominal conditions. This occurs mainly in women. When associated with splanchnoptosis it is a purely medical condition. Movable kidney may also be included in this class. While these various phenomena usually occur as a result of the stretching of the normal peritoneal ligaments due to an absorption of fat, surgery has only a limited field here. When the stomach alone is ptosed a reduplication of the gastrohepatic omentum may relieve the symptoms. In cases of movable kidney we may occasionally do some good by sewing the kidney in position. The object of bringing in this class of cases for argument is for the purpose of reminding you that while the condition is symptomatic it is perfectly benign. These prospects should be considered good risks.

Occasionally the appendix may be considered an upper abdominal organ. This is found when the colon fails to rotate as it should. I have found the appendix in the epigastric region on several occasions. The situation of the appendix in the region of the gallbladder is more common than in any other part of the abdomen except the right iliac fossa. An applicant who has had chronic appendicitis, provided he never had an acute attack, should be considered a good risk. If there is a history of an attack of acute appendicitis, no operation having been performed, then I believe the risk ought only be classed as fair. If the person submitted to an operation then he should be rated a good risk. The rule in cases of appendicitis seems to hold here also that after operation the patient is a better risk than before operation.

It is well understood by all that any case of cirrhosis of the liver, Banti's disease, and the various anemias associated with disease of the spleen can never be considered insurable risks.

In conclusion I must admit that I have entered on this subject with much trepidation on account of my inexperience with subjects of this character. I have never been a medical examiner; the thoughts expressed here are entirely opinions that I have on the subject were I to be called in a given case. The opinions expressed may differ widely from yours or from the instructions that you receive relative to this work which carries with it such great responsibility. You want to be just to all; at the same time it is essential for you to be well informed physicians so that as few mistakes as possible will be made.

Finally we have touched the mere outline of the diseases that may affect the abdomen in a medicosurgical sense. It is my belief that the prospect is a better risk after operation than before.

1738 Pine Street.

Carcinoma, with Especial Reference to the Alimentary Tract*

By WILLIAM EARL CLARK, M.D.,
and
MATTHEW WHITE PERRY, M.D.,
Washington.

Any discussion by a clinician on the subject given would be incomplete without a tribute to the many men who are devoting their lives to experimental research in the problem of cancer. Probably no one subject in medical research has presented a more complex and difficult problem to its workers. We, in practical medicine, are likely to overlook the debt we owe the research laboratory worker, and do not often enough realize that largely to him is due credit for the greater part of that scientific knowledge on which successful practice is based. The great hope of the future in the problem of cancer centres around the experimental laboratory. No problem in medicine is more closely dependent on animal experimentation and the hope of the future lies in the maintenance of this type of study and research.

Fortunately there is abundant material on which to work in an experimental way. Cancer is very common in the lower animals. Melanotic sarcoma in dapple gray horses, and mammary carcinoma in dogs are not infrequent. Many fowls are subject to sarcoma and fish to carcinoma. Most frequent of all, however, is the occurrence of carcinoma in rats and mice, and fortunately so, for these animals furnish excellent material for research work and in them it is easy to transmit growth by inoculation of bits of malignant tissue.

Much has been learned concerning the biology of tumors from the study of transplanted rat and mouse cancer. The occurrence of spontaneous cancer, while relatively frequent, has not been frequent enough to supply the large numbers necessary in experimentation. Since the discovery that cancer could be transplanted, investigation of such transplant tumors has engaged students. Transplant tumors have been shown to be in many respects fundamentally different from spontaneous tumors. It has been said that transplant tumors, "Merely represent artificially produced metastases of one animal into the tissues of another and are always growths of cells derived from the cells of the original tumor animal and not the cells of the host. The spontaneous tumor, of course, represents growth of the tissues of the animal that bears it. The inoculated animal, in all probability, would never have had a tumor of its own tissues. Thence the conditions must be quite different from what they are in the animal that suffers maligant transformation of its own tissues. As evidence that there is such an essential difference, a large proportion of implanted tumors may undergo spontaneous disappearance and cure, which apparently never happens with spontaneous malignant tumors." (1)

The great advantage which could result from study of spontaneous tumors is as evident as is the limitation attached to the study of transplanted tumors. The problem is the obtaining of sufficient animals with spontaneous tumors to supply the demands of research work. Of late it has been shown that spontaneous tumors may be artificially provoked, and production in this way of spontaneous tumors in experimental animals promises a solution to the problem. By imitating in animals conditions which are known to provoke cancer in man, and by taking advantage of conditions that have produced cancer in animals, it has been possible to induce spontaneous cancer. We have long known that epitheliomata frequently arise in workers in tar. Applying this knowledge, Japanese workers, who seem at present to be doing some of the best work on the problem, have produced such tumors on the ears of rabbits and the backs of mice by repeated paintings with tar (2). In the second of these ways, that is by imitating conditions which are known to have produced cancer in animals, it has been possible to produce rat gastric carcinoma in a number of instances. Febiger (3) accidentally found that certain types of rates which lived largely on cockroaches commonly had chronic gastritis and often cancer of the stomach. Investigating this further he found that the cockroaches were infested with a parasitic worm which when ingested by the rat bored into the gastric mucosa of the animal. The resulting irritation apparently served as a sufficient etiological factor to produce carcinoma. Experimentally by feeding such infested roaches he has been able to produce spontaneous gastric cancer in a number of cases. Thus is opened up hitherto unobtainable material for research, material not limited biologically as is transplant tumor material and definite hope for further progress may be held.

It is also possible by so crossing animals in which tumors have spontaneously appeared, in other words by selective breeding, to produce strains of rats in which spontaneous occurrence is relatively high (4).

Among the many practical problems which have been studied in transplant tumors is that of the effect of diet on the rate of tumor growth. We have all no doubt wondered, in handling cases, whether by restriction of diet along certain lines we might slow up growth or lessen metastases and thus lengthen life. It has been shown that a diet which provides the most satisfactory growth of somatic cells is also most favorable to tumor growth. In transplanted cancer, however, the administration of cholesterol parenterally or orally has the power of tremendously stimulating tumor growth and metastasis. Accordingly diets rich in this substance would seem to be bad, and have been so shown in transplant tumors. Whether or not this holds true for spontaneous tumors is not known. Some evidence is to the contrary. Work along this line has been done by Robertson and Burnett (5) and confirmed by Sweet and his coworkers (6). The latter were able to obtain from a tumor which had never previously yielded metastases, by the administration of cholesterol by mouth, 104 metastases out of 116 inoculations. It has also been found that diets deficient in certain aminoacids, essential to cellular growths, inhibit tumor growth also, as would be expected. Such diets, however, would obviously be detrimental to the general health of the host.

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*Read before the Medical Society of the District of Columbia, November, 1922.

All in all, in an experimental way, a tremendous amount of truth and knowledge is being uncovered in the experimental laboratory, and this constant accumulation of bits of knowledge will eventually supply the key to the cancer problem.

The etiology of cancer is such a broad subject that we shall attempt only a brief statement of a few practical aspects; the rôle of chronic irritation, and the rôle of heredity. Both have occupied a prominent place in recent thought. Formerly not seriously taken, of late the feeling has become more and more pronounced that both play large and important rôles. Especially is this true of chronic irritation. It is repeatedly and in many ways shown that chronic foci of irritation or inflammation represent potential precancerous lesions. One has only to recall the frequency of cervical carcinoma in the lacerated cervix of the multipara as compared with its infrequency in that of the nullipara; the frequency in which it used to occur in the chimney sweep; in the Irishman repeatedly burning his lip with his short clay pipe; in the workers in paraffin and wax and tar; in those with chronic varicose leg ulcers; and in many other instances, to be impressed with this factor. Less familiar instances of the same may be of interest. In Kashmir the natives are in the habit of carrying a charcoal burner suspended beneath their robes against the anterior abdominal wall. Epithelioma of the abdominal wall is more frequent in this locality than in any locality of the world.

The publications of the British Imperial Research Cancer Fund cite other interesting examples of this fact. In certain parts of India cattle are made to draw loads by means of a cord passed through a hole at the base of the horn. In such cattle malignancy of the pulp of the horn is relatively frequent. In Egypt malignancy of the bladder is common and it is thought due to the prevalence of bilharzia, acting as a chronic irritation to the bladder wall. Many other examples are cited in this report such as the great frequency of malignancy of the mouth in betel nut chewers, its absence in the glans penis of circumcised races. Bloodgood has studied a large series of malignant conditions about the oral cavity and is of the opinion that recognizable precancerous lesion, in the form of a chronic area of irritation or inflammation, existed in practically all. It is this indisputable evidence which makes one search for the factor of long standing irritation as a precursor of gastrointestinal cancer. That such exists in the greater frequency of gallbladder cancer where gallstones are present, and in the greater frequency of cancer of the colon in the presence of the chronic inflammation of diverticulitis, is generally accepted. That chronic gastric ulcer is the precurser of most gastric carcinoma is also held in many quarters. It would seem logical from what has been said that it should be. There is much difference of opinion, however, in regard to this. The Rochester and Chicago clinics, from analyses of large series of cases, strongly hold the opinion that in the largest group of cases of gastric carcinoma they obtain a typical history of chronic peptic ulcer, in most instances dating back for years. They have carefully studied specimens removed in the operating room and have found in the edge of large callous ulcers beginning cancer. In other words the patient gave symptoms typical of ulcer and what seemed to be an ordinary callous ulcer was removed at operation and after careful study showed that cancer had started in the edge of the ulcer.

Most of us in clinical medicine in the East have had an impression differing from this view. It seems the largest group of cases that we see with cancer of the stomach state that they have rarely had indigestion until the onset of the present complaint. That there are other fundamental causes than chronic irritation is shown by the fact that duodenal carcinoma is practically never seen, while duodenal ulcer is much more frequent than gastric ulcer. It is said that the difference in reaction of the contents of the two areas may explain this phenomenon, that gastrointestinal carcinoma is practically confined to that part of the bowel where an acid reaction exists. While this largely holds true for the stomach and large bowel, it does not for the mouth and esophagus where alkaline reactions exist. Probably the more likely cause lies in the fact that more highly specialized structures are more prone to malignant change and that the stomach and colon represent more highly specialized structures than does the small bowel, the latter more nearly approaching the character of primitive gut.

We have reviewed our cases of gastric carcinoma to find the percentage in which we obtained a history suggesting preexisting ulcer. Of fourteen consecutive cases, carefully worked up, nine gave no history suggestive of a preexisting ulcer (sixty-four per cent.) Two gave a history typical of preexisting ulcer (fourteen per cent.) Three gave a history of indigestion which could possibly have been due to a gastric ulcer (twenty-one per cent.)

Of peptic ulcer in general we have found the percentage of gastric ulcer lower, and that of duodenal ulcer higher than ordinarily stated. Of seventy-one consecutive cases of peptic ulcer diagnosed during the past twelve months, seventy-nine per cent. have been duodenal ulcer and twenty-one per cent. gastric ulcer. In our opinion the incidence of gastric ulcer is less frequent than ordinarily stated.

The question of heredity in cancer is one frequently asked us by our patients, and is a vital one. Should the offspring of cancerous stock be more closely watched for early malignancy? There seems to be more of a tendency for clinicians to feel that there is an element of heredity in the condition and certainly there is experimental evidence of such. Slye (4) in the article already quoted has shown that by selective breeding not only may spontaneous cancer become more frequent but there is also an hereditary tendency for involvement of the same organ to occur, as for example cancer of the uterus in successive generations. A few years ago, however, Hoffmann for the Prudential Life Insurance Company, investigated the problem from the viewpoint of their statistics, concluded that while cancer was on the increase, there was no proof of heredity. A. S. Warthin (7) on the other hand, from the pathological material at the hospital of the University of Michigan, handled by him from 1895 to 1913 and compared with accurately taken histories, draws opposite conclusions, and his statistics are convincing. So striking are his conclusions that we have copied them as a whole: a, A marked susceptibility to carcinoma exists in the case of certain family generations and groups. b, This susceptibility is frequently associated with marked susceptibility to tuberculosis and also reduced fertility. c, The multiple occurrence of carcinoma in a family generation practically always means its occurrence in a preceding generation. d, The family tendency is usually more marked when carcinoma occurs in both maternal and paternal lines. e, Family susceptibility to carcinoma is shown particularly in the case of carcinoma of the mouth, lip, breast, stomach, intestine and uterus. f, In a family showing the occurrence of carcinoma in several generations there is a decided tendency for the malignancy to develop at an earlier age in the members of the youngest generations. In this case it often shows an increased malignancy.

In our work, in twenty-five consecutive cases of gastrointestinal malignancy there was a family history of malignancy in only one (four per cent.). Patients were questioned as far back as grandparents, uncles and aunts. As a control twenty-five consecutive cases of nephritis were reviewed. A family history of malignancy was obtained in only one case.

The problem of heredity is far from settled. Most of the data on which our opinions are based are obtained from large hospital records where the class of patients handled makes it difficult to obtain accurate and reliable histories. The factor of error in such is obviously great. We who are handling an intelligent and reliable class of patients are in a much better position to obtain accurate information on such subjects. It is from the private clinic that the most reliable statistics should come.

Approximately thirty per cent. of all cancers are cancers of the stomach. Two thirds of all gastrointestinal cancer are of the stomach. Cancer of the sigmoid and rectum is relatively frequent but nothing like so frequent as of the stomach. It is almost universally believed that cancer is on the increase but, as has frequently been pointed out, we must bear in mind the remarkable extension of life as a result of vaccination and hygiene. Within thirty years there has been an extension of ten years of life expectation. Many more people are reaching a cancer age than formerly. The increase in external cancer is not out of proportion to this extension of life. Internal cancer has apparently increased out of proportion but one must remember that the correct diagnosis of internal cancer is a comparatively recent achievement in diagnosis. Thus, on analysis it is evident that there is probably no real increase in the incidence of cancer other than that due to more people living to the age when malignant changes are prone to occur.

Since this paper was written an article has appeared confirming this opinion (10). W. T. Howard, in an analysis of the vital statistics of Baltimore, finds no evidence of increase of cancer. The records of an individual community such as this, where skill in diagnosis may be assumed to have been above the average, are probably the most reliable we have.

Our only hope in early recognition of gastrointestinal cancer is to endeavor to get the patients suffering with indigestion to submit to a careful diagnostic study. This is especially important if the patient is at or near the cancer age.

There are no definite pathognomonic signs of cancer that can be recognized in the early stages of cancer of the alimentary tract. The symptoms are often like the indigestion that one encounters in less serious disorders. Any patient, however, with a persistent indigestion, should be suspected of malignancy until it can be proved otherwise. One should not wait for the appearance of marked anemia and loss of weight.

In cancer of the esophagus difficulty of swallowing is usually the first symptom. It will occur irregularly after coarse articles of food. Gradually this symptom will become more persistent and after a time the patient will be able to swallow only soft or liquid foods. Pressure or discomfort in the region of the cardia or in the lower chest will be added, also eructations, and after a period weight loss, anemia and other constitutional signs. The passing of a stomach tube will often locate a dilatation above the growth containing excess of mucus and food which has stagnated there. The x ray is the greatest aid in early diagnosis. Cardiac spasm gives a typical picture with the x ray, very different from the narrow irregular bismuth tract seen in malignancy.

Patients with cancer of the stomach can be placed in two groups according to the histories given. First, there is a small group giving a typical history, x ray appearance, and even in the operating room the appearance of a callous peptic ulcer. In the edge of the ulcer one can demonstrate beginning cancer. As a rule after an ulcer has undergone malignant change the pain may be less severe but is more persistent and exhausting. The patient soon develops a fear of eating. Loss of weight begins. He complains of belching, often sour eructations, bloating, nausea and vomiting. There is less food ease, less soda ease and the chief means of relief is from vomiting or from opiates. The next group, and the larger group in our experience, is one in which the patient has previously enjoyed excellent digestion until the onset of the present symptoms. The early signs are much like simpler forms of indigestion, loss of appetite, epigastric discomfort, pressure, ache, bloating, nausea and vomiting. Some give histories of indigestion suggestive of chronic cholecystitis, or appendicitis, or simply vague nervous indigestion. Others present themselves for examination on account of hemorrhage, or perhaps the appearance of a lump in the epigastrium.

Certain familiar points in examination seem worth emphasizing. In a case of suspected malignancy the patient shrould have the bowel well cleared with a dose of castor oil or an enema. Another important procedure is to wash out the stomach with a soft rubber tube. In this way one gets rid of, not only the distended stomach, but distended loops of gut that would make the examination difficult and prevent one palpating a tumor mass. The stomach tube will also reveal undigested food, mucus and changed blood which have stagnated in the stomach. The odor of gastric contents in these cases is usually pungent, rancid and disagreeable. Test meal extracts may show high acid values in group 1 (The cases appearing to be simple calloused ulcers). In the other group one will find diminished free hydrochloric acid and peptic values. In the average case, both free hydrochloric acid and total acidity are low and lactic acid is found in many cases. The finding of Oppler Boas bacilli is frequent in the cases with obstruction and not infrequently in those without obstruction. The blood examination in the early cases may show very little departure from normal, unless there have been recent hemorrhages. As the disease progresses an anemia develops that is a typical secondary or chloranemia. Later the leucocytes usually increase moderately. The study of the feces is most important. In practically all cases there are soft spots which tend to ooze blood or ulcerate and occult blood can be demonstrated in the feces in a large proportion of cases. X ray technic has been so improved that small early defects can be recognized. Information gained in this way will reveal practically all cases. There are no specific tests. Attempts at serodiagnosis have failed. A most interesting laboratory test, holding forth the hope of possible help in early diagnosis, and especially in differential diagnosis, is the variation in the blood sugar curve recently emphasized by Friedenwald and his associates (8). It has long been known that the blood sugar was high in carcinoma in general. These workers have elaborated earlier work along this line and have shown that after administration of one hundred grams of glucose on a fasting stomach there occurs a rather characteristic curve of sugar tolerance. This occurs in all carcinomata, it is asserted, but differs sufficiently in gastrointestinal cases to make it of diagnostic importance. They are of the opinion that it is of great aid even in early cases, but that it grows progressively more so as the case advances. Our own experience with this test, in a small series of cases, has been disappointing.

Cancer of the large bowel occurs most frequently in the cecum, sigmoid and rectum. Cancer of the large bowel is usually relatively slow in growth and there seems to be less tendency to metastasis. Symptoms common to the group are increasing constipation, pains of a peristaltic character, and finally symptoms of obstruction which may set in suddenly. The patient also usually gives a history of passing an excess of blood, mucus, and often pus. The more general use of the proctoscope can not be too much insisted upon. Every case of hemorrhoids should be so investigated.

We have obtained the best surgical results in cases of cancer of the large bowel. Most of the growths have been removed after a twostage operation. A preliminary colostomy is advised and after the obstruction has been relieved and the distended proximal gut has gone down to a normal size and the patient gotten in better condition, the growth excised.

In conclusion we would emphasize that patients who are at or near the cancer age should not be allowed to go for months with an indigestion that is of a progressive type, with more or less continuous symptoms, especially with weight loss and increasing anemia. Such patients should be put through a careful diagnostic study including gastrointestinal x ray examination. If the result of this study is strongly suggestive of malignancy, these patients should be submitted to exploratory operation. If we wait for months, until the more definite symptoms occur, the growth will usually be advanced to such a stage that no successful cure can be obtained. In this way our percentage of cure may be considerably improved.

The author's references will appear in his reprints.

Carcinoma of the Esophagus

By JOSEPH M. MARCUS, M.D.,
and EDWARD A. ARONSON, M.D.,*
New York.

There are many of us who occasionally meet with a patient in whom we have completely satisfied ourselves as to the presence of a tumor and, on its disappearance independent of any treatment, we are compelled to admit how little our knowledge of medicine is after all.

Unquestionably, benign and malignant growths disappear, as noted from the large number of cases reported in the literature. According to Ribbert, spontaneous cure of malignancy depends on the biology of the cancer cells, and occurs comparatively seldom. It is positively known that scirrhous growths may be completely obliterated, but partial healing occurs more frequently.

Czerny makes mention of the fact that carcinoma of the stomach after gastroenterostomy—carcinoma of the rectum after establishing an artificial anus—carcinoma of the breast in women after castration—can be brought to a standstill with partial regression.

Ewing says that spontaneous cure is observed with certain tumors under peculiar conditions. There is a considerable series of polypoid tumors of the skin and mucous membranes where nutrition is cut off by constriction of the pedicle, and such are either completely extruded or regress without detachment. Within the tumor hyaline degeneration of the vessels and mucous degeneration of stroma and parenchyma usually retard growth and may completely exhaust the capacity for growth.

Benign tumors such as exostoses (Nasse, Starck) and papilloma of the bladder (Nitze) have been known to regress. A local or general immunity seems to be the only explanation of an increasing list of spontaneous cures of highly malignant tumors. Most of these cures are only partial; among them are sarcoma, squamous epithelioma and glandular carcinoma (Czerny).

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*Dr. Edward A. Aronson died on June 24, 1922.

In a consideration of colitis polyposa, Ewing states that the chief seat of intestinal polyposis is the rectum, and the great majority of carcinomas following this condition develop in the rectum or the colon. The ileum or jejunum is rarely affected, but Hauser and Kaufman saw the involvement of the entire mucosa, from the pylorus or cardia to anus, and lesions in the duodenum, jejunum and ileum are reported by Lubarsch, Niemack, Petrow and others. Of thirty-four cases collected by Thorbuke, twenty-three were in the rectum, five in the colon and rectum and six in the colon alone.

Ewing believes that because he finds a diffuse and pronounced hypertrophy of the epithelial lining, a condition arises which is the excessive reaction of the epithelium to irritants. Spontaneous regression has been observed after sidetracking the affected region and after partial excision (Rotter).

Greene (1) reports the case of a physician, aged fifty, who had always enjoyed good health. There had been no history of syphilis nor tuberculosis. The family history was negative except that the patient's paternal grandfather died, probably of carcinoma. About three months before the examination, the patient began to complain of a slight pain in the throat, worse at times when the larynx was in a certain strained position. Examination showed the chest to be negative, there were no glandular enlargements anywhere. There was no cough and hoarseness was very slight. A small growth over the centre of the left cord, about the size and shape of a small grain of wheat, was seen, but pedunculated; the surface appeared uneven and the attached base was distinctly red. Within a week the size of the growth had materially increased and was regarded as a carcinoma. Five months later there was absolutely no sign of the growth. The patient had had no treatment.

Gould (2), in speaking of the cure of cancer, i. e., the disappearance of cancerous growths, said that it, undoubtedly, occurs in animals and is observed in human pathology. It is most frequently seen in the gradual absorption and disappearance of small, secondary nodules in the skin and subcutaneous tissues. Many years before he had shown a patient before the London Clinical Society who recovered spontaneously and completely when she had seemed to be at death's door from cancerous deposits in the lung and neck of the femur, secondary to cancer of the breast.

More recently he had had a woman of fifty-two with advanced cancer of the uterus; the organ was fixed in the pelvis, the cervix ulcerated and masses of the growth were felt invading the anterior wall of the rectum. Three years later the examination of the uterus showed it to be small and senile; the vagina narrowed at its upper end, the cervix small; no ulceration nor growth anywhere; uterus was mobile. The original disease had entirely disappeared.

Another case was that of a trained nurse with a carcinoma of the left breast; amputation of the breast followed. Fifteen months after, a lump was removed from the axilla. Five months later she was operated upon for recurrence in the axilla and skin. She was again operated upon six months later when the axilla was thoroughly cleaned out. This was repeated again after one year and it was found impossible to remove the growth under the arm. The wound healed quietly, the edema of the arm and all evidence of the presence of a growth disappeared. Gould saw this patient again after an interval of ten years and she was enjoying the best of health.

He mentions still another case of a young woman with bilateral carcinoma of the breast, of which later necropsy showed no signs.

He said that cancer even when advanced in degree and of long duration may get better and does sometimes get well. There is cure of cancer apart from operative removal.

Jonathan Wright (3), whose article deals with the microscopic examination of endolaryngeal tumors, says in his introductory remarks, "that there was no doubt that cases of carcinoma existed, which up to a certain period of their growth not only showed the typical clinical picture, but were also diagnosed as such by expert microscopists. Nevertheless, the growth disappeared with or without a radical operation and the patient remained permanently in perfect health. In such cases the clinician or surgeon may possibly doubt his own diagnosis, but is rather more inclined to believe in an error by the microscopist."

Power (4), in a paper on what he describes as vanishing tumors, describes the case of a boy of eight with a cystic lymphangioma of the left side of the neck which was frequently tapped; later he made an excision of a part of it at the posterior angle of the neck. Two months later it was noted that the lower part of the growth was very large and after a period of five months, the boy had several attacks of lymphangitis, after each of which the tumor decreased and finally disappeared.

Koschier (5) believes there is a difference in the virulence of some carcinomata; lymphosarcoma disappears sometimes completely after a minor—certainly an incomplete operation.

Hodenpyl (6) reports the case of a patient, aged thirty-seven at the time, whom he saw with a carcinoma of the breast. The clinical course and morphology of the tumor were typical of a rapidly growing malignant cancer. In spite of radical operation, multiple recurrences appeared in the neck and in the primary scar. At the thorough removal of these, secondary growths appeared which were morphologically typical of rapidly growing carcinoma. Later large tumors developed in the liver which nearly filled the abdominal cavity, followed by the presence of an excessive chyliform ascites. The prognosis was unqualifiedly bad, and the patient's death seemed imminent. Nevertheless, the tumors in the neck and breast dwindled and disappeared. The abdominal tumor gradually grew smaller and became imperceptible while the liver became smoother and smaller. Four years after the operation, the liver was approximately normal in size and position. In the discussion of this case, the writer mentions the development by the patient of some sort of antibody inimical to the growth and persistence of the cancer cells.

The following case of carcinoma of the esophagus has so many unusual points of interest that we feel amply repaid in reporting it.

CASE.—The patient, Mrs. H. B., aged sixty-three, presented herself with the following history: The chief complaint was difficulty in swallowing, duration about six months. Her family history was negative; her husband died of pulmonary tuberculosis; she had had six children, no abortions, menopause at fifty. Past history: typhoid in childhood, at times socalled rheumatism, and had lived in the United States for the past thirty-three years. Present history: six months ago she noted a slight difficulty in swallowing solid food and felt a sensation of constriction at about the jugular fossa; there was no radiation of this sensation. This ceased when food was washed down with a fluid. There was no difficulty in the swallowing of soft foods nor fluids. Appetite was good, with only occasional vomiting. There was no loss of weight. She was a rather rapid eater, drank no tea, moderately of coffee and was of an exceedingly neurotic temperament.

The examination in brief was entirely negative physically, except for the presence of a left femoral hernia. There was no obstruction met in the passage of a stomach tube. She was given a test meal which showed a total acidity of 26 and free hydrochloric acid of 18. The urine was entirely negative.

The fluoroscopic examination at this time showed a narrowing of the middle of the esophagus, with an irregularity at this point. The barium column was arrested at the cardia. There was also some dilatation of the esophagus above the point of arrest. The examination of the stomach was negative except for a marked gastroptosis and a diminished tonicity. At the end of six hours there was no residue. Shortly after this we referred the patient to Dr. Leopold Jaches and we submit his report and x ray illustration.

The röntgen ray examination (fluoroscopic and stereoradiographic) of the chest of Mrs. H. B. showed a marked diffuse dilatation of the aorta, almost aneurysmal in character, and apparently an aneurysm of the innominate artery at its origin. There was a slight deviation of the trachea above its bifurcation, but no constriction, due to the encroachment of the aorta. The lungs and diaphragm failed to show any abnormality. The measurements of the heart on a teleröntgenogram (six feet distance) were: Mr. 3.5 cm.; Ml. 9.4 cm., which is approximately normal. Examination of the esophagus with the aid of a barium mixture showed delay to the passage of the mixture, about three inches above the cardia, and an apparent irregularity which extended from the point of delay downwards for nearly two inches. There was marked retroperistalsis in the esophagus above this area, but no absolute obstruction, so that a spoonful of the barium mixture had to be given before each plate was taken in order to obtain on the röntgenograms the site of the incomplete obstruction and the irregularity below it. Owing to the dilatation of the aorta the indentation to the esophagus at the level of the arch was much more marked than normally. No abnormality was seen in the stomach.

We disagreed with Dr. Jaches in his interpretation of an aneurysm being present and regarded the shadow as described, as being rather a metastatic node with the primary growth in the esophagus.

Realizing that the patient's only chance lay in surgical interference, we referred her to the Mount Sinai Hospital, service of Dr. Howard Lilienthal, hoping that he would be able to apply the operation, as recently described by him (7). This operation was performed on June 23, 1921. On June 16th, i. e., one week before the operation, an esophagoscopy was performed under local anesthesia by Dr. Kaempfer, and he reported that "33 cm. from the teeth there was an obstruction occupying the posterior half of the lumen resembling granulation tissue." A specimen was removed for biopsy and Dr. F. S. Mandelbaum, the pathologist, reported that the specimen showed an inflammation and was insufficient for complete examination. The Wassermann reaction was negative. On June 25, two days after the operation, the patient gave evidence of a very extensive bilateral bronchopneumonia. Her condition was a critical one, and one week later, owing to her weakened condition, she was given a blood transfusion. Two days later, i. e., on July 4th, the patient suddenly went into collapse, the pulse became irregular and respiration finally ceased.

An autopsy was performed and we submit the following report from the pathological laboratory:

"General: Body was that of a fairly well nourished adult female. No petechiæ; no jaundice; no edema, incomplete rigor mortis. There was a large infected gaping wound in the left infrascapular region. There was a resection of the ninth, tenth, eleventh ribs and excision of the intercostal muscles. To the left side of the vertebral column the esophagus was encircled by two rubber tubes and resting on a healthy skin graft, except for eight cm. along the free border. The pleura was exposed and on its external surface there was a thick greenish exudate. There was no communication with the pleural cavity on the right side. The diaphragm was intact. The dome of the diaphragm on the left side reached the fourth intercostal space: The dome of the diaphragm on the right reached the fifth intercostal space. One and a half inches above the bifurcation of the trachea was a globular mass about five by three by two cm. which rested on the trachea compressing it. It was elastic in consistency and on section presented a granular yellowish firm surface having the appearance of carcinoma. In some places, hemorrhage had taken place into the mass.

"The left lung was firmly adherent to the parietal pleura and striped with difficulty. Pulmonary artery and vein were negative. The lower lobe of the left lung showed congestion; lack of aeration, but is not friable. The rest of the left lung and entire right lung were markedly edematous. There were no metastases.

"The pericardial cavity was free of adhesions and contained normal amount of pericardial fluid. The heart was small, flabby and its musculature brown. There were no thrombi in the right auricle. The tricuspid valve admitted three fingers. The papillary muscles were extremely thinned, small, and brownish. The chordæ tendineæ were threadlike. The pulmonary artery was somewhat dilated. The mitral and aortic valves were negative. The aorta had a normal elasticity. The coronary arteries showed small patches of atheroma.

"The mediastinal lymph nodes were moderately enlarged, increased in consistency and black in color. On section they showed no signs of metastases. The bronchi were negative. The trachea at the first thoracic vertebræ showed some flattening. At the level of the fifth thoracic vertebræ there were seen small yellowish excrescences in the mucosa of the esophagus and an area of erosion and hemorrhage. There were no macroscopic evidences of tumor. Thyroid section showed white specks with areas of hemorrhage. Innominate subclavian, common carotid, external and internal carotid arteries were all negative. Due to limited permission, no other organ was examined.

MICROSCOPICAL EXAMINATION.

"The esophagus showed necrosis and ulceration of the mucosa with carcinoma infiltrating the base of the ulcer. Hemorrhage into the necrosis of the wall of the esophagus was present. There were organized thrombi in the vessels. The lung was emphysematous. Mediastinal lymph node showed metastatic squamous cell carcinoma, replacing the entire lymph node with necrosis and pearl formation. The diagnosis was carcinoma of the esophagus, with infection of wound. The cause of death was myocardial insufficiency, metastatic paratracheal growth (carcinoma) causing compression of trachea."

A review of this case presents many interesting facts. First: the comparatively short history. Second: the mild subjective complaint, namely, substernal pressure on swallowing. Third: the irregularity of the esophagus at the point of delay to the barium column, but no absolute obstruction, and the shadow which the röntgenologist regarded as an aneurysm of the innominate artery. Fourth: the absence of any tumor in the esophagus at autopsy, but which before operation may have been an inflammatory mass.

The diagnosis to be discussed, when taking the history and the findings into consideration together with the cancer bearing age of the patient, could very likely be that of a carcinoma of the esophagus. How long this carcinoma had been really present is, naturally, a difficult thing to say; one would have expected that a neoplasm of a fair size could produce this delay to the barium column together with the apparent irregularity in the outline of the esophagus. It was, naturally, a great surprise to find that on autopsy no tumor mass was present, but only the small ulceration which, as the pathologist described, contained cancer cells. It is only a possible, perhaps a probable assumption, that a tumor had been present and the ulcer was merely an ulcer rest. From the onset of the symptoms until her admission into the hospital for operation, there had been no treatment applied to the esophagus.

We first became acquainted with carcinoma of the esophagus when Galen introduced his Tuberculum Carnosum. In the tenth century Avicenna made mention of neoplasma as a cause for dysphagia. Fernel in 1656 and shortly afterwards Coiter first reported carcinoma of the cardia. Sylvius in 1665 also spoke of it. In later years Walshe, Lebert, Köhler described the disease more in detail. Schreiber was able by means of an esophagoscopy to aid in the diagnosis.

Despite the fact that diseases of the esophagus are comparatively uncommon, carcinoma is the most frequent disease affecting this organ. Statistically speaking, it is now an accepted fact that of all carcinomata, carcinoma of the esophagus occupies the fifth place in point of occurrence. As far as the etiology is concerned, we know practically nothing. The most frequent localization is significant of those places where the esophagus is narrowest in a physiological sense, and this is suggestive of the irritative theory put forward by Virchow, because at such points mechanical and chemical factors have most influence. Another etiological consideration is the fact that the esophageal carcinomata may arise in the traction diverticula, together with a simple stenosis and occasionally develop into a dilatation of the esophagus.

Heredity plays no rôle. As a rule carcinoma of the esophagus, as in all carcinomata, is a disease of later life. Heimann observed a case in a patient nineteen years of age. Stuart, one in a twenty-three year old girl; von Hacker, one in a thirty-one year old individual; Kraus, one in a thirty-four year old patient, and one in a thirty-one year old man. From the literature we can conclude that it is of comparatively rare occurrence before the fortieth year, and most cases are observed in the fifth and sixth decades. Curiously enough, males are more frequently affected than females. This is further peculiar because of the larger number of females who succumb to malignancy rather than males.

Metastatic carcinomata involving the esophagus are hardly known. It is in some cases a secondary growth mostly submucous and derived from the lymph passages or the cardiac end of the stomach; more seldom from the pharynx or the thyroid gland. The most frequent neoplasms of the esophagus are the primary ones, and of the squamous epithelial type. Both types may occur in the scirrhous form.

During the course of the disease, stenosis occurs and this is soon followed by dilatation and hypertrophy of the organ above the site of the lesion. As far as localization is concerned, carcinoma may affect any portion of the esophagus, but there are some points of preference, such as those places which show physiological narrowing. In the course of the disease about one half the cases lead either to perforation followed by infiltration into surrounding inflammatory tissues or into contiguous organs.

As far as perforation is concerned, most frequently it occurs into the larger air passages. When inflammatory infiltrations occur, there follows dislocation, displacement of the trachea and larynx with subsequent malignant progress, particularly at the point of bifurcation and more frequently into the left bronchus. These perforations are not necessarily fatal, and may be followed by gangrene of the lung. Perforations may also occur, though less frequently, through the pericardium and be followed by a carcinosis affecting the heart muscle.

There are but few cases described in the literature, and this is probably due to the fact that perforation into the pericardial cavity is most frequently fatal. Some cases have been described where the disease made such progress as to invade the large bloodvessels, and this was followed by thrombosis.

The secondary extension occurs by direct continuity into the stomach or pharynx. The latter occurs very seldom. The extension into the stomach is more frequently seen when the cardia becomes involved. There may be an extension into the mediastinum or the neck. When such an extension occurs into the mediastinum the recurrent nerves and the vagus particularly on the left side, and even the sympathetic can become involved. More infrequently the spinal vertebræ may be affected.

Metastases occur as a rule through the lymph and blood channels. These metastases may be found in the immediate neighborhood; on the pleura, on the pericardium, on the gastric mucosa beyond the cardia and in the esophagus itself. Furthermore, carcinomatous glands may be found, such as esophageal, tracheal, bronchial, at the bifurcation and epigastric. Further metastases may be found in the liver and the lungs.

Metastases from primary carcinoma of esophagus according to Osler (8) are really more frequent than ordinarily supposed. He says: "For many years an impression prevailed that carcinoma of the esophagus had not so great a tendency to form metastases as had carcinomas elsewhere, but this arises from no inherent peculiarity of the growth itself. It probably happened that the secondary growths in the deep cervical glands were often overlooked. It is even more likely that the importance of the structures involved leads to a comparatively early fatal result, at which time the lymphatic involvement and especially extensive involvement of distant organs, is as yet not prominent. The comparatively short duration of carcinoma of the esophagus, compared with that of other sites, is in favor of this explanation. Twelve cases at autopsy in the Royal Victoria series showed secondary growths in eight."

Death usually follows from inanition and cachexia or as a sequel to a perforation.

The clinical importance of carcinoma of the esophagus lies in its effect in producing a narrowing of the esophageal lumen. As a result there are disturbances in swallowing, which may be the first symptom. The dysphagia may follow very slowly. As a result of a diminution in the amount of food intake, emaciation follows. The stenosis may become so marked as to seriously interfere with any food intake.

Carcinoma of the esophagus never runs its course without this accompanying disturbance in the swallowing of food. At times this may be much less than at other times. Apart from this disturbance, severe pain may also be present. This pain has a distinct drawing or tearing character, often referred to the back and referred to the shoulders. It may occur only at a time of eating or may be entirely independent from the time of eating. Among the subjective disturbances hunger and marked thirst may be present.

As far as the diagnosis is concerned, we must rely on x ray esophagoscopy and biopsy.

The duration of the disease is difficult to estimate. It may extend all the way from six months to two years.

We herewith desire to express our thanks to Dr. F. S. Mandlebaum, director of the pathological department, for the many courtesies extended.

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120 WEST SEVENTIETH STREET.

Subhepatic Abscess Secondary to Appendicitis*

By PAUL W. ASCHNER, M.D.,
New York,
Adjunct Surgeon, Mount Sinai Hospital.

The various types of abscess complicating acute appendicitis and its postoperative course have received considerable attention from surgeons who have described that common and protean disease. Abscesses occur after removal of the appendix in the following way:

1. They may occur about the appendix stump. The abscesses are intraperitoneal if the stump has not been buried. They are in the cecal wall if the stump has been inverted or buried.
2. They may occur as the localization of an unresolving peritonitis. Such abscesses may be present and overlooked at the primary operation, may develop by extension from the stump region, or as the result of progressive fibrinopurulent peritonitis.
3. They may result from infection spreading by way of the appendicular veins.
4. They may result from extension by way of the lymphatics.

The abscesses are usually described according to their anatomical location. In the cases reported herewith the abscess occupied a position below the right lobe of the liver, in front of the kidney and above the hepatic flexure of the colon. In other words, it occupied the subhepatic fossa or Morison's pouch. Abscesses in this location have been classified inadvisedly, I believe, as subdiaphragmatic.

Barnard, in his excellent addresses on Surgical Aspects of Subphrenic Abscess, defines the latter as any localized collection of pus which is in contact with the under surface of the diaphragm. The under surface of the diaphragm is marked out by the cruciform arrangement of the liver ligaments into four peritoneal fossæ and two extraperitoneal cellular spaces, named as follows:

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A. Intraperitoneal
  I. Right
    1. Anterior.
    2. Posterior.
  II. Left
    3. Anterior.
    4. Posterior.
B. Extraperitoneal
    5. Right.
    6. Left.

It is the right posterior intraperitoneal fossa with which we are concerned. Barnard describes it as follows:

"It is a pyramidal space transversely disposed beneath the overhanging margin of the liver. Its base and most capacious part rests against the right lateral abdominal wall, projecting just below the last rib. The apex is formed by the upward slope of the margin of the left lobe of the liver. The liver and gallbladder are its anterior boundaries throughout. The posterior wall is divided into a right and left part by the projection forward of the lumbar vertebræ in the middle line. . . .

"Its posterior wall is formed by the upper part of the right kidney, and by the lower part and crus of the diaphragm, and towards the left by the common bile duct and duodenum. It is here that the foramen of Winslow leads into the left posterior intraperitoneal fossa (lesser sac). To the left of the middle line the fossa is a narrow cleft between the right lobe of the liver in front and the small omentum and upper and anterior surface of the stomach behind. Above the subhepatic fossa is bounded on the right by the right lateral ligament of the liver and on the left by the transverse fissure. Below the boundary is formed on the left by adhesions between the margin of the liver and the anterior surface of the stomach, and on the right by similar adhesions of the great omentum and transverse colon to the margin of the liver and the anterior abdominal wall."

Of seventy-six subphrenic abscesses at the London Hospital this fossa contained pus in ten cases and always in association with pus in some other fossa. Six of the ten cases were due to appendicitis.

Lockwood, writing of subdiaphragmatic abscess at the Mayo Clinic, follows Barnard's classification and includes abscesses of the subhepatic fossa.

An examination of the longitudinal section of the thorax and abdomen in the plane of the gallbladder and of transverse sections at the level of the upper third of the right kidney, will show that the subhepatic fossa is practically excluded from contact with the diaphragm and its right crus. The upper pole of the right kidney is uncovered by peritoneum and is in contact with the uncovered area of the liver. The posterior or lower leaf of the coronary ligament is reflected off from the parietal peritoneum covering the middle third of the right kidney. It therefore follows that the right kidney, when normally placed, excludes the subhepatic fossa from contact with the diaphragm. Reference to the diagrams in Cunningham's *Anatomy* will make this point clear.

Sir G. H. Makins, in the *Oxford Surgery,* clearly describes subhepatic abscess complicating appendicitis and advocates the surgical approach which was employed in the cases here reported.

For purposes of diagnosis, prognosis, and treatment subhepatic abscess should be distinguished from subphrenic abscess.

CASE I.—(Hosp. No. 198102.) Mrs. D. V., aged thirty-six, was admitted to Dr. Lilienthal's service January 15, 1920, with a history of sudden onset of abdominal pain the preceding evening accompanied by vomiting, fever, and chills. There was general abdominal tenderness and rigidity of the recti, most marked in the right lower quadrant. At operation free pus was found in the pelvis and along the right lumbar gutter. The appendix was free, gangrenous and perforated. It was removed and tube drains placed in the pelvis and the right lumbar gutter.

Until the fifteenth day the patient's temperature remained below 101° F. Although there had been fascial necrosis, the tube drains were removed and the wound was healing. Now, however, the temperature rose to 102° or 103° F. every afternoon and a search for its cause was begun. The accessory sinuses and lungs were negative. The abdomen was negative except for slight tenderness in the right kidney region. The bladder urine showed pus and Bacillus coli, and therefore pyelitis was suspected. Cystoscopy, however, yielded clear sterile urine from both kidneys.

Tenderness gradually increased in the right renal area and became more marked anteriorly. On February 29th, six weeks after operation, a firm tender mass was palpated just below the liver edge and as this was ballottable into the loin, a perinephric abscess anterior to the kidney was suspected.

On March 1st a four inch incision was made parallel to the twelfth rib, practically the anterior half of the usual kidney incision. The perirenal fat was normal. The peritoneum in front of the kidney was thickened and appeared to overlie an exudate. Aspiration yielded thick pus and on entering the abscess cavity it was found to be intraperitoneal, occupying the space between the under surface of the liver and the hepatic flexure of the colon. The space between the liver and diaphragm was free and clear.

Drainage by tube was established and a rapid convalescence followed. The patient was discharged healed March 19, 1920.

CASE II.—(Hosp. No. 199854.) A. L., a boy of six years, was admitted to Dr. Lilienthal's service March 23, 1920. Nine days before admission he was taken ill with symptoms suggesting influenza. Four days ago abdominal pain, vomiting, fever and constipation appeared. There was general tenderness and rigidity of the recti. A tender pelvic mass was felt by rectum. At operation a diffuse spreading peritonitis due to a perforated appendicitis was found with large collections of pus in the pelvis and right lumbar gutter. Drains were introduced in these situations after the appendix had been removed. On April 1st there was but little discharge and the temperature was reaching normal limits. On April 4th a small tender mass, two inches in diameter, was discovered in the subhepatic area and the temperature was found rising every afternoon. On April 14th the mass had become larger. The blood count showed 22,000 leucocytes, eighty-three per cent. polynuclears. One consultant said the mass represented a normal kidney, but I was convinced that a subhepatic abscess was present. As in the preceding case a three inch incision corresponding to the anterior half of a kidney incision was made. An abscess was found in the subhepatic fossa between the liver and the hepatic flexure of the colon. Although for a time the patient improved in every way, a month later he had to be operated upon for abscess in left lower quadrant, then for a left subphrenic abscess, and finally for a pulmonary abscess of the left lower lobe. After a stormy convalescence, including wound diphtheria, the patient recovered and was discharged healed July 22, 1920. In this case we were dealing with a progressive fibrinopurulent peritonitis.

Case III.—(Hosp. No. 211903.) L. G., a boy aged thirteen, was admitted to Dr. Moschcowitz's service July 20, 1921, with a history of five days' pain in the right lower quadrant of the abdomen, accompanied by fever. There was tenderness, rigidity and a boggy mass in this area. At operation, a retrocecal gangrenous appendix was found with pus in the pelvis. After appendectomy and pelvic drainage the temperature failed to reach normal, and on July 30th rose to 103° F. There were no subjective symptoms but tenderness was elicited in the right upper quadrant. With persistence of temperature, leucocytosis and tenderness, it was decided to explore the subhepatic region.

August 13, 1921. An oblique incision below the twelfth rib was made (as in the preceding cases). The perirenal fat was normal. On opening the peritoneum in front of the kidney, numerous filmy adhesions of the colon to the liver presented, but no pus was found. On separating these adhesions working upward and backward along the under surface of the liver an abscess was entered which extended behind the liver. It could not be determined whether the process began intraperitoneally or as a lymphatic infection of the retrohepatic cellular tissue (in which case it would be a subphrenic abscess). Excellent drainage was obtained by the approach employed. Healing was complete on September 2nd.

In the following case a subhepatic exudate developed which either resolved or ruptured into the bowel. No operative interference was necessary.

Case IV.—(Hosp. No. 215,084.) M. L., male, aged twenty-three years, was admitted to Dr. Moschcowitz's service November 19, 1921, with four days' history of abdominal pain, localizing to the right lower quadrant. The lower abdomen was rigid and tenderness was most marked at McBurney's point. At operation a gangrenous appendix was removed and a drain placed to the pelvis because of beginning peritonitis. Temperature was normal by the fifth day, but on the twelfth day it rose to 101° F. and thereafter daily to 102°. Tenderness in the right hypochondrium and right costovertebral angle was elicited and on December 5th the leucocytes were 30,400, eighty per cent. polymorphonuclears. A distinct tender mass was detected deep in the right hypochondrium. On December 10th the temperature dropped to normal. The rigidity and tenderness of the right upper abdomen rapidly disappeared, and the mass became more easily palpable, but no longer tender. By December 22nd, the leucocytes were 12,400, fifty-four per cent. polymorphonuclears, and the mass had completely disappeared. It appeared that the exudate had undergone resolution, or spontaneous drainage into the bowel.

A patient operated upon for appendicitis with more or less peritonitis, and presenting the usual postoperative improvement for one or two weeks, manifests afternoon fever and polymorphonuclear leucocytosis without other subjective symptoms. Physical examination at first reveals no localizing signs but sooner or later deep tenderness is elicited in the right upper quadrant just at or below the liver edge. A mass is finally detected deep in the subhepatic area and tenderness in the tenth and eleventh right intercostal spaces, and in the costovertebral angle. The mass may be ballotable into the loin and suppuration of or about the kidney is suspected. There are no evidances of irritation of the diaphragm nor of impaired aeration of the right lung. The grave signs of toxemia in subphrenic abscess are usually absent.

With the onset of remittent or intermittent fever; and with no subjective or objective symptoms to indicate the true lesion, wound retention, subphrenic infection, hepatic abscess or beginning pylephlebitis are considered as possibilities. Then as tenderness appears below the liver edge, or in the costovertebral angle, one begins to suspect the kidney, and the urine may confirm that suspicion by coincidence. Finally when a mass becomes palpable in the right renal area a perinephric abscess in front of the kidney, or an abscess of the kidney itself, cannot be excluded with certainty, as cystoscopic examination is usually completely negative in perirenal suppuration and cortical abscess.

While the diagnostic difficulties are considerable in patients recently operated upon for appendicitis, they are much greater when, because of the location of the appendix, a subhepatic abscess presents as the primary condition.

The inflammatory exudate may occasionally resolve. If suppuration supervenes the abscess may rarely drain itself by breaking into the bowel. As a rule surgical drainage is indicated, and the approach should be made through a loin incision which permits of adequate exposure of the organs and spaces under suspicion, without risk of soiling the general peritoneal cavity.

As already indicated subhepatic abscess occurs, as a rule, in patients who show more or less spreading peritonitis at the primary operation, and the prognosis would naturally vary with the extent of the peritonitis and the patient's ability to localize it. When the subhepatic fossa becomes infected from the right anterior subphrenic space as in Barnard's cases the prognosis is dependent upon that of the subphrenic infection.

It is apparent from the position of the abscess that it is walled off by the liver and kidney from the vulnerable diaphragm and pleura, while the omentum and colon protect the general peritoneal cavity. A well localized suppurative focus such as this offers a good prognosis if it is recognized early and drained by the proper route.

For anatomical and clinical reasons subhepatic abscess should be distinguished from subphrenic abscess. The best surgical approach is through the loin by an incision corresponding to the anterior part of the usual kidney incision.

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The Rôle of Bacillus Welchii in Gangrenous Appendicitis*

And the Use of the Antitoxin of Bull and Pritchett in Its Treatment

By JOHN E. JENNINGS, M.D., F.A.C.S.,
Brooklyn,
Surgeon, Brooklyn Hospital.

Before the war we had noted a few isolated cases of peritonitis following gangrenous appendicitis in which it was evident that Welch's bacillus was a pathogenic factor. Some of them were associated with retroperitoneal edema of rather marked degree. Some were attended with gangrene of the abdominal wall. All were highly toxic and all were fatal. We had become convinced that the clinical picture of the local lesions was more or less characteristic and in a few cases we were able to anticipate the presence of the Bacillus aerogenes capsulatus, which cultivation and animal inoculation afterward verified.

We considered, at that time, however, that these were rather rare infections. We had no therapeutic measures with which to combat the inevitably fatal issue and the difficulties of routine anaerobic bacteriological study hampered further investigation. The studies of gas gangrene made during the war and the notable work of Bull and Pritchett with their preparation of an antitoxin were in mind when we returned to civil practice.

During the winter of 1919 and 1920 a series of gas gangrene infections occurring in my service at the Brooklyn Hospital, which I shall report elsewhere, led us to the use of a mixed perfringens and tetanus antitoxin, the only one available. Its striking success in these cases suggested the consideration of its possible value in cases of gangrenous appendicitis, with spreading peritonitis, and led us to the study of the rôle of the Bacillus Welchii in the course of that disease. Our brief experience in the course of that study has seemed sufficiently interesting to warrant this preliminary report. A study of the rather rich literature on the Bacillus Welchii shows a surprising poverty in studies directed toward one of its more obvious spheres of action.

Welch records thirteen cases of diffuse peritonitis in which Bacillus Welchii was found. Ten of these were perforative and three nonperforative cases and he also notes the presence in two cases of circumscribed gas containing intraperitoneal abscesses resulting from perforation of the appendix vermiformis.

Flexner made cultures at various times postmortem, from sixty cases of endogenous peritonitis, and found Bacillus Welchii in eight cases, usually in mixed cultures. His work done in 1898 seems quite primitive and not at all complete.

Wright and Stokes isolated the organism in pure culture from peritonitis complicating typhoid as did also Hitschmann and Lindenthal and Von Hibler and a number of other observers have found it in cases of peritonitis of various types.

Veillon and Zuber made a valuable contribution in which they first definitely noted the presence of Bacillus Welchii, which they called Bacillus perfringens, in infections of the appendix. Their conclusions are worth translating and transcribing. The suppurative infections of the appendix in which the organ is gangrenous, perforated or on the point of being so, in which the pus has a markedly fetid odor, contain in abundance anaerobic microorganisms which we have been able to isolate and describe. When they contain streptococci and colon bacilli, which is not absolutely constant, these latter organisms are always present in infinitesimal quantity in proportion to the others.

Dudgeon and Sargent made a study of the bacteriology of appendicitis in England in 1905 in which they came to the conclusion that the Bacillus coli was the most frequent cause. They did not believe that anaerobic bacteria played any important rôle in appendicitis or peritonitis. They believed that if Bacillus Welchii was frequently present in cases of appendicitis, emphysematous gangrene of the bowel should be a common lesion instead of an interesting curiosity and that foaming viscera should be seen very frequently at autopsies on patients dead from appendicitis. Instead there was only one case of foaming organs in such cases among the autopsies at St. Thomas's Hospital in one year, 1905. They found themselves quite unable to grow streptococci but cultivated staphylococci and pyocyaneus with their colon bacilli. Their work would be negligible were it not that it would seem to have diverted attention from the study of the significance of the anaerobes in this disease, being quoted by Simonds in 1915 as the last word on the subject.

On the other hand, Lanz and Tavel found in 138 cases of appendicitis Bacillus edematis maligni in forty-nine, classing under Bacillus edematis maligni various anaerobes including Bacillus Welchii.

Runeberg in 1908 found Bacillus Welchii once in fourteen cases of appendicitis. He believed that anaerobes played an important part in appendicitis and peritonitis by the production of toxins rather than by actually taking part in the infection.

Heyde of Friedrich's Clinic in Marburg in 1911 published a monograph on the anaerobes in appendicitis. He concluded that anaerobic bacteria were present in one hundred out of 102 cases studied and that they were present in greater profusion than aerobes in all stages of appendicitis and peritonitis and attributed to them the direct causation of inflammation, of gangrene and of toxemia. He found that the perfrigens group (Bacillus Welchii) outstripped all others in rapidity of growth.

Grigoroff studied eighteen normal and thirty-one diseased appendices. In the normal appendices, aerobes and anaerobic specimens were present in approximately equal proportions or aerobic organisms were more abundant. In the inflamed appendices, however, the strictly anaerobic bacteria were strikingly predominant. In the thirty-one cases of appendicitis, Bacillus perfringens (Bacillus Welchii) was found nine times.

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*From the Surgical Service, Brooklyn Hospital.

Simonds, in his classical monograph, Studies on Bacillus Welchii with Special Reference to Classification and to Its Relation to Diarrhea, noted in 1915 that the relation of anaerobes in general and of Bacillus Welchii in particular, to appendicitis is still unsettled. He found Bacillus Welchii in the sporulating form in pus from an appendix abscess and found spores of Bacillus Welchii in ninety per cent. of normal appendices obtained at autopsy. They were present in approximately one hundred per cent. if the appendix contained fecal matter. He attributed to Hitschmann and Lindenthal the statement that Bacillus Welchii never forms spores in tissues in which it is playing a pathogenic part and remarked that it is possible therefore, if spores of Bacillus Welchii are present in appendiceal pus, that its presence is only accidental and not in any way connected etiologically with the infection.

Our problem seemed to be briefly this—the Bacillus Welchii is a normal inhabitant of the gut in man. It, with other anaerobes, produces gangrene in simple and mixed infection. We have seen cases of peritonitis in which infection with this was the apparent cause of death. We have in our possession an antitoxin which proved its usefulness in infection by the Bacillus Welchii elsewhere. Is this serum useful in appendicitis and if so how?

Our investigations may be grouped as follows:

1. Bacteriological studies of the contents of the appendices removed at operation.
2. Bacteriological studies of specimens of tissue from the wall of oppendices removed at operation without invasion of the lumen.
3. Bacteriological studies of the fluid removed from cases of peritonitis secondary to gangrenous appendicitis.
4. Bacteriological studies of the blood in cases of Bacillus Welchii infection.
5. Postmortem studies in cases of death due to peritonitis and appendicitis.
6. Clinical studies of the usefulness of perfringens antitoxin in cases proved by culture, infections with Bacillus Welchii.

I shall discuss briefly the results of each of these groups of study. Simonds notes that he found Bacillus Welchii in the sporulating form in pus from an appendix from the clinic of J. E. Thompson, and that he found spores of Bacillus Welchii in ninety per cent. of normal appendices removed at autopsy. They were present in approximately one hundred per cent. if the appendix contained fecal matter. Our experiments agreed with this. Cultures taken from the lumen of the appendices removed at operation, whether acutely inflamed or not, showed in ninety per cent. of the cases a positive culture of Bacillus Welchii.

In seven cases in which the appendix was acutely inflamed, thickened and edematous, but with no gross perforation, cultures made of portions aseptically removed in the operating room and so cut as to remove the peritoneal and muscular coats of the organ without invading its lumen, also showed the presence of Bacillus Welchii.

In sixteen cases localized pus collections with gangrene showed Bacillus Welchii and in forty cases in cultures made from free fluid in the pelvis or general peritoneal cavity Bacillus Welchi was found ten times.

The results of blood cultures were for the most part negative. The studies of the blood made in cases of gas gangrene during the war, showed that blood culture is negative at the beginning of gangrene. In cases fully developed, Lardonois and Baumel found seven positive cases in forty-eight cultures. Weinberg and Seguin found four positive cultures before death in twenty cases of hemoculture. Delbet and Fiessinger found two positive in seven blood cultures made in the agonal period. It is evidently the general opinion that the passage of organisms into the blood occurs just before or after death, as the antitryptic index and alkalinity are lowered.

It is evident that Bacillus Welchii is present in the lumen of most appendices and is frequently found outside of the lumen of the gut in an actively growing form in appendicular abscess and in localized peritonitis and in a rather large number of cases in free peritoneal exudate. That in most cases its activity is cut short by operation with removal of the appendix and adequate drainage. This, however, is not always the case and it is apparently an active factor, if not the most active factor in the production of a fatal issue.

In the fatal cases that we have been able to study, the Bacillus Welchii has been present with a large amount of peritoneal exudate, in some cases generalized and in others walled off.

In the beginning of our studies we were handicapped by the fact that culture, made at the time of operation, required from twelve to twenty-four hours for an available report. We found, however, that by making injections of the suspected material in the liver of the living guineapig, killing the animal at the end of three minutes after the injection, placing the animal in the incubator, making a section of the animal at the end of two hours with study of the liver, was an adequate clinical test. This method we have checked by guineapig controls and by milk cultures of material made at the same time. It places a bacteriological diagnosis of the presence of Bacillus Welchii within range of clinical usefulness and will be reported more fully in another communication.

After we had satisfied ourselves that the Bacillus Welchii was a factor we began to inject an immunizing dose of the perfringens serum as a routine in cases of gangrenous appendicitis with spreading peritonitis. In one case, 577-22, in which this was done, there developed an active, general peritonitis from which the patient died. Welch's bacillus being isolated in large numbers from his peritoneal exudate and from his heart's blood immediately postmortem. Since that time it has seemed desirable to make the injections intravenous when indication for its use is found.

The margin, with use of the serum in appendicular peritonitis, is not very wide. The diagnosis of the presence of the organism must be promptly made. The use of the serum must be equally prompt. It must be given intravenously. The doses should be liberal and should be repeated before evidences of profound intoxication have made their appearance.

Occasions in which we have used the serum fall into three groups:

1. Those in which its use is unavailing. The failure in these cases is due to: a. an inadequate dose, b. administration too late.

2. Cases in which an early administration of the serum, with absence of severe clinical symptoms, leaves room for discussion as to the necessity of its administration at all. This is the ideal use of any antitoxin. It is the way in which diphtheria and tetanus antitoxin are most ideally used. It is the ideal way for the use of this one.
3. Cases in which the indication, both bacteriological and clinical is unmistakable and in which liberal use of the serum was attended with striking success.

I shall report a few cases from each of these groups. In seven patients dying of appendicular peritonitis in my service in the last two years, five showed positive cultures of Bacillus Welchii; in two cases the cultures were negative and in one no culture was taken.

Case I.—In the positive cases, one, 577-22, showed Bacillus Welchii at operation with a moderately severe, generalized peritonitis, was drained with appendectomy, in the usual manner and given twenty c. c. of serum subcutaneously, a dose which proved inadequate. Distention and vomiting developed on the second day postoperative. The patient's pulse was imperceptible for seven hours before death. His temperature remaining below 100° F. and consciousness persisting to the last twenty minutes. Death occurred four days postoperative. The picture, so characteristic of peritonitis, is identical with the classical descriptions of death due to gas bacillus poisoning from gunshot wounds of the extremities.

Case II.—739-22, a child of five years, showed general diffuse peritonitis of seventy-three hours' duration with cyanosis, distention, feeble and thready pulse. At operation, free turbid fluid in the peritoneal cavity, a leaking abscess. Appendix showed terminal gangrene with a small perforation. One hundred c. c. of perfringens antitoxin was given on the operating table. Six hours after operation the radial pulse was imperceptible and more serum was given, 150 c. c. in the vein, 200 c. c. in the axilla following which the patient rallied. A few hours later another collapse was controlled by more serum. Altogether 970 c. c. of antitoxin were given, most of it intravenously. The patient rallying after each administration. Seven days after operation lobar pneumonia developed. In the meantime the abdominal distention continued extreme and never yielded to treatment. On the eleventh day the pulse became imperceptible, the hands cold and clammy, lips cyanotic, distention extreme, respiration labored, conscious till the last. Guineapig culture was positive. At autopsy the last twelve inches of the ileum were found gangrenous and adherent to the pelvic wall causing a complete intestinal obstruction. The general peritonitis had subsided but the local gangrenous process had gone on.

It has been our experience that the use of antitoxin does not affect the growth of the organism in the wound discharges nor in the tissues of the abdominal wall.

The only hope for recovery in this case lay in the recognition of the obstruction and operative relief, which, with the added burden of a pneumonia, she could hardly have borne. It is evident that the germ was especially virulent and that not only the appendix but the entire lower ileum was affected by the gangrenous process as it so often is in a suppurative one. The antitoxin prolonged life sufficiently to allow the development of this unusual condition.

Case III.—The next (3241-22) case showed an old abscess, three weeks old, with previous attacks, and many old adhesions, causing partial obstruction. The dissection of the abscess and liberation of the ileum, initiated a peritonitis which proved fatal. The Welch bacillus was recovered from the drain and 200 c. c. of the serum were given intravenously, forty-eight hours after operation, without material effect. In this case, as in the preceding one, the terminal collapse was sudden. The administration of antitoxin was late and inadequate. In a similar case I should now use a larger dose and give it sooner.

Case IV.—1805-22, man, forty-seven years of age. Vomiting and pain in the abdomen for twelve days before his admission. A large mass in the lower abdomen, the size of a grapefruit, near the midline was found. At operation the whole lower abdomen was filled by an inflammatory mass which involved the intestines and seemed to originate, from its position and nature and extensive amount of pus, from a ruptured appendix. Finger dissection, opened into the mass. About one quart of very foul smelling, thin pus was obtained. Counter incision made into the left inguinal region in which a rubber drain with iodoform gauze in it was inserted, two rubber tubes to the appendix region and pelvis. The appendix was not found. Caprolith was in cavity. Bacillus Welchii was reported in the pus from the cavity. Five hundred c. c. of serum given thirty hours after operation, 200 c. c. given twelve hours later and 100 c. c. of serum given twelve hours after the second injection. There was a tremendously severe intoxication. Serum injection was followed by temporary improvement. Failure to hold this resulted in collapse and death. The patient should have had serum earlier, more serum and more frequently.

Case V.—3826-22. The patient came to us late in the course of a peritonitis. He had a large amount of free, turbid fluid in the general peritoneal cavity with a partial wallingoff, by omental adhesions, in the pelvis. He took the anesthetic badly and left the table with a great deal of froth in his throat. An immediate guineapig culture gave positive result for Bacillus Welchii and 100 c. c. of antitoxin were given in the vein. For twenty-four hours he did well and his peritonitis seemed under control but on his second day pneumonia developed and the patient died, with edema of the lungs.

In the other three cases no serum was used nor was the Welch bacillus recognized as being present. They may therefore be ignored in this discussion.

The second group of cases is that in which an early administration of antitoxin was followed by recovery and the suggestion that they probably would have recovered without its use. This, as I have said, is the way to use an antitoxin of any kind. No apology is therefore given for its use in these cases. The only question in my mind is how much to give and what is the earliest indication.

We have had fourteen such cases with suppurative, gangrenous appendicitis and established diffuse peritonitis, in whom the presence of Bacillus Welchii has been recognized and an immediate injection of antitoxin given. Most of these patients, evidently sick enough at the time of operation, have had a chill and serum reaction an hour or two after the injection and have then proceeded to recovery.

The third group consists of patients in which the administration of serum to desperately sick patients, which proved Welch's bacillus infection, has been followed by dramatic and brilliant results.

In this third group several cases seem worthy of more or less detailed report.

Case VI.—1811-22, a strong man of twenty-six years of age, traveling salesman, had right lower quadrant pain for thirty-six hours with vomiting, distention beginning, abdomen still boardlike, cyanosis and dilated pupils, pulse thin and running. Operation disclosed free fluid, pus not foul, appendix gangrenous, surrounded by foul abscess, leaking. Five hundred c. c. of antitoxin was given on the table and 200 c. c. given twice during the first three days after operation, which were stormy. The effect of an intravenous injection of antitoxin was noticeable in this case, as it was in Case II. The cyanosis disappeared. The pulse improved and slowed and the whole appearance was altered for the better. He took 900 c. c. of serum and made a good recovery. Curiously, in his second week an axillary abscess appeared at the site of a hypodermoclysis, from which Bacillus Welchii was isolated in pure culture. There was no crepitation nor gas formation. The skin was somewhat bronzed. The blood was repeatedly negative.

Case IX.—2842-22, a girl aged seventeen. Seventy-two hours after the onset there was general rigidity with beginning distention. At operation, free, turbid blood stained fluid in the peritoneum was found. There was a large mass the size of a croquet ball, flattened against the pelvic wall, half above and half below the brim, with the omentum adherent over the mass. The pelvis was full of turbid seropus. The appendix was gangrenous at its middle, and removed with the adherent mass of gangrenous omentum. A drain to the pelvis was inserted. Guineapig culture in two hours. Two hundred c. c. perfringens serum was given. There was a good recovery with long draining abscess cavity.

Case X.—4875-22, showed another leaking abscess. The patient was a young woman of twenty-two, telephone operator. Operation was done ninety-six hours after onset. The retroperitoneal tissues and peritoneum were injected, the peritoneal cavity containing a large amount of straw colored fluid, small intestine slightly injected, cecum normal. A mass was discovered the size of a tennis ball, tense, and riding above the pelvic brim, just below the anterior superior spine. The omentum was adherent. The mass was covered with lemon false membrane. A drain to the pelvis and to the appendix stump was inserted. The guineapig was positive for Bacillus Welchii in two hours. Two hundred c. c. perfringens serum was immediately given with 200 c. c. saline solution in the vein. The recovery was prompt and free from complications.

The mortality in gangrenous appendicitis is by no means as low as one would like to think, as may be seen by anyone who cares to study the tabulated causes of death shown in the weekly reports made by the Health Department of the City of New York.

The ideal time of removal in suppurative appendicitis is before gangrene has occurred. The removal of a gangrenous appendix, with proper drainage and aftertreatment, results, in a large number of cases, in recovery. In a certain number of cases, however, death occurs and it is apparent that a certain proportion of those, how many we cannot say, are due to the activity of the Bacillus Welchii.

The evidences of intoxication due to the Bacillus Welchii, in the peritoneal cavity, are insidious in their onset and do not differ from those which have been associated with septic peritonitis for many years. There may or may not be a rise in temperature. The pulse frequently rises, cyanosis in some degree is an early sign and increases with the severity of the case. As the case advances the pupils dilate, the skin becomes cold and clammy, the pulse becomes thready, feeble and impalpable. Consciousness is frequently unimpaired until the last or a short period of delirium may occur. The cyanosis now becomes extreme and death supervenes.

It seems probable that the Bacillus Welchii infection in appendicitis occurs, as a rule, in symbiosis with a number of other organisms. The streptococcus and Bacillus coli, as well as other organisms, are present. Just what the relation of these organisms is to the disease and to each other remains a field for study but in the possession of a potent antitoxin to the Welch bacillus we have another weapon which should not be longer ignored.

Our present position with regard to its use is as follows:

1. At the time of operation in a case of appendicitis with localized, spreading, general peritonitis, culture and guineapig inoculation should be made at the time. The report from the animal will be available in two hours. The culture will be available, for verification, in from twelve to twenty-four hours. If the animal shows the presence of Bacillus Welchii, intravenous injection of from one hundred to two hundred c. c. should be immediately given (in certain cases of spreading peritonitis a smear from the peritoneal fluid will show the presence of encapsulated bacilli, recognizable as morphologically Bacillus Welchii, in such cases even two hours wait before injection is unjustifiable.

2. From twelve to twenty-four hours is a suitable interval for further injection of one hundred c. c. The clinical response, in cases showing rapid pulse and cyanosis, is well marked, the pulse slows and improves in quality, the cyanosis disappears and the patient's general morale noticeably improves. In active cases of diffuse peritonitis the serum should be used in massive and repeated doses, and it is of course to be emphasized that in no way should the antitoxin be used to supplant the surgical measures already at our command nor to favor delay in operative treatment.

It will be evident that the use of the antitoxin in intestinal obstruction and as a prophylactic in gunshot wounds of the bowel and in operations on the intestinal tract must suggest itself. We have had some few interesting experiences with its use in these conditions as well as in infection of the genital tract in the female and genitourinary tract in the male and the gallbladder. I shall report these in a later paper but wish to emphasize the opinion that the relation of this organism to gastrointestinal pathology well deserves further careful study.

23 South Portland Avenue.

Reports of Cases VII and VIII will appear in the author's reprints.

The Diagnosis of Appendicitis

By LOUIS DROSIN, M.D.,
New York.

Notwithstanding the frequent occurrence of appendicitis and in spite of its many signs and symptoms, a correct diagnosis is still conjectural and in many cases it is impossible. This is particularly true in chronic cases. Unless the physician has himself observed a typical acute attack he frequently has to accept the patient's word for its previous occurrence.

There are many methods of examination now in use, and many more that have been temporarily regarded as entirely determinative but which have eventually fallen into disrepute. Among these is McBurney's point. "It is no longer to be depended upon" (1). Almost all the signs and symptoms of appendicitis are common to many other pathological conditions. This statement holds true for even the most important of these signs—localized pain and tenderness with or without rigidity in the right iliac fossa, or, to be more correct, in the region of the right iliac fossa.

This sign can be produced by other causes, yet it remains the most reliable, the most important and the most constant. When we can elicit this sign and exclude other conditions which might cause it, we are almost safe in our conclusion that the case is one of appendicitis.

In recurrent appendicitis, however, in which the patients have had a number of typical attacks, unless some inflammatory condition remains or adhesions have formed, it is impossible to elicit pain or tenderness even though noninflammatory pathological changes are present. Should some trace of inflammation remain, or adhesions form, then the characteristic localized pain, or tenderness, can be brought out. This may be accomplished by the following methods which I have found reliable in a large number of cases. They were corroborated by dependable previous histories or by operation:

1. With the patient lying on the back, the knees either flexed or extended (both postures should be tried), place two or three fingers of the examining hand on the abdomen or near it, to the right of a line midway between the umbilicus and the ensiform cartilage. At the end of an expiration give a sudden thrust backward. In very acute cases this thrust should be moderate. If inflammation or adhesions are present and unless it is very low down, retrocecal, or adhesions are absent, the patients will experience a sensation at the seat of the trouble which they variously describe as a pull, a turn, a twist, a jar, or a knock. They sometimes feel a mild pain in the region of the appendix, but never a severe pain even though the case be acute.

This procedure can be repeated but a few times, especially if the thrust causes pain or shock on the spot where the thrust is made. The reason for this is that the patient will very quickly anticipate the action and will voluntarily or involuntarily resist by holding his breath or by contracting the abdominal muscles. This sign is present in postoperative adhesions also. The result is undoubtedly obtained by the direct or indirect jar or pull on the cecum and appendix, on adhesions, or on all combined, through the colon and disturbance of its contents. It is probably assisted also by the reversed peristalsis present in the ascending colon.

2. With the patient lying in the Sims position, on the right side, his back preferably toward the examiner, no pillows under the head, the abdominal muscles will be relaxed and the cecum and appendix brought upward and forward so as to come readily into the palpating hand. Press the tips or the palmar surfaces of the fingers backward, systematically covering the whole ileocecal region until the painful spot is encountered. In some patients the same result can be obtained in the simple lateral position, on the right side, with legs flexed.

3. The patient lies on his back, left leg extended and right leg flexed so that the thigh and abdomen will form a right angle, or approximately one, the thigh being supported by the arm and elbow, two or three inches below the knee (behind the thigh), knee relaxed and leg hanging loosely in the air. In this position the appendix and cecum are brought upward and forward, as well as toward the median line. The rectus muscle is relaxed, and real rigidity, if present, is made out. If rigidity is brought on by the patient's fear, this is easily eliminated. The ileocecal region and adjacent area can then be palpated and pathological conditions of the appendix or cecum can be defined.

That this method of palpation and the Sims posture do bring the cecum and appendix upward, forward and sometimes to the median line is proved by this fact: not only can the morbid condition be located with facility, but the position of the pain will be higher and more to the centre than when felt in the usual posture for abdominal examination. If in this latter (the usual) posture, where both legs are either flexed or extended, the pain can also be localized, then we have further proof, by comparsion, that these positions bring the cecum and appendix upward, forward and to the median line.

4. During a prolonged interval between an expiration and an inspiration the abdomen, as a rule, is completely relaxed. If during this interval pressure is applied, independently or in combination with the methods outlined above, it will be found useful in eliciting the sign of localized pain. Some abdominal walls are so relaxed that the patient can be examined satisfactorily regardless of expiration. But whatever the degree of relaxation, more definite and accurate information may be obtained by bimanual and bilateral pressure—the simultaneous use of both hands. The palmar surfaces of the fingers of each hand occupy a corresponding area over the abdominal wall, and in this way the surface of the involved field may be covered. As the pressure is even and the examination simultaneous the information derived from this method is more trustworthy than when one hand is used alternately for comparison of each half of the abdomen. This is best carried out with the examiner between the patient's knees or thighs.

The methods I have been describing are not applicable in acute and chronic cases of appendicitis alone. They are useful in other pathological conditions of the abdomen. In my experience, tuboovarian diseases with all their variations always require bimanual (combined intravaginal and abdominal) examination for a diagnosis. Even where these patients experience pain as a subjective symptom (unless peritoneal irritation or peritonitis is present), tuboovarian troubles are rarely affected, aggravated or located by external abdominal pressure examination alone.

Bassler (1) has pointed out that although in most individuals the appendix is usually situated at an identical point in the cecum, yet the cecum differs widely in situation. Its position varies from a rather high level in the iliac fossa to "perhaps well over the brim of the pelvis, even as far as the median line. This change represents a curve of practically five inches in length—the appendix in different individuals is situated anywhere between the two ends." By percussing out the limits of the cecum the appendix may be more readily located and any localized pain may then be elicited by the methods I have described.

In closing my paper I wish to give a brief description of a case of more than usual interest to the profession. It will illustrate that appendicitis even with an abscess may resolve without leaving subjective symptoms, and, unless the x ray might show it, without objective symptoms also.

Case I.—The patient, a man about forty years of age, a baker by occupation, came under my observation about two years ago. He was married, had several children, and was in very poor circumstances—if that fact had any bearing on the case. He had an abscess the size of a large egg, easily palpable and almost visible, in the right iliac fossa. His temperature by mouth was 102° F. He neither looked nor acted like a very sick man; there was nothing in his appearance to indicate the extent and gravity of his pathological condition. I advised an immediate operation but he refused this, giving as a reason that he was afraid. I explained to him that unless he had the operation, he would die. He then told me the following story: He had been a patient at the Flower Hospital and was to have been operated on for appendicitis by Dr. A. A. Berg. Although the patient was actually on the operating table, fear overcame him and he got off and went home. He was willing now, he said, to return to the hospital but was afraid that Dr. Berg would refuse to take care of him. I immediately reassured the patient, promising to speak personally to Dr. Berg as I was confident he would not refuse.

In a telephone conversation with Dr. Berg I reminded him of the case and was then told that this man had walked off the operating table not once, but twice, and furthermore, since the patient left the hospital another physician than myself had previously called him up to the same effect. Dr. Berg expressed himself as being entirely willing to take care again of the patient on the following conditions: that I personally make the arrangements for his readmission and that when he entered the hospital again Dr. Berg would come to see him. I made the arrangements, but the patient failed to come in.

Several weeks later I met the person upon whose advice the man had first come to me ,and I was told that the patient, instead of going to any hospital at all, had remained in bed for about three weeks and that he was now perfectly well. I told my informant that I would consider it a personal favor if he would send the man to me for an examination. A short time afterward the patient presented himself at my office looking hale and hearty. I then made a thorough and prolonged examination which revealed nothing whatever. I have subsequently made three other examinations and, in each instance, with the same negative results.

In the recurrent form of appendicitis, periods of perfect health do separate the acute attacks, although the textbooks doubt that such attacks ever run their course to recovery leaving a perfectly healthy appendix, pathologically considered" (1). The case I have been describing had reached the point at which spontaneous recovery rarely occurs and it would be interesting to know by what means recovery was brought about and to what extent pathological conditions would still be found existing in the appendix.

SUMMARY AND CONCLUSIONS.

Although appendicitis is of the most frequent occurrence and has many symptomatic signs, it is often difficult and sometimes impossible to diagnose it. The most important and most constant of these signs is tenderness and localized pain. In recurrent appendicitis it is difficult to elicit the pain when the examination is made with the patient lying in the usual posture and when unimanual pressure is the method employed in palpation.

There are four different postures in which it is possible to bring out the location of pain if combined with a special method of eliciting the pain.

In the first method a sudden backward thrust is given from the examining fingers to the right of a line between the umbilicus and the ensiform cartilage. The pain elicited will be mild even if the case is acute. Usually no pain is felt, but a shock described as a twist or other mechanical effect. This is especially symptomatic of adhesions.

The second position is the Sims with the patient lying on his right side. This posture brings the cecum and appendix upward and forward into the palpating hand, the tips and palmar surfaces of which are employed for pressure.

In the third position the patient lies on the back with the right leg supported under the knee (left extended), which also brings the cecum and appendix upward and forward and tenderness or rigidity may be made out if present.

In the fourth method, during a relaxed state of the abdominal walls between expiration and inspiration, bimanual pressure over both sides of the abdomen will give diagnostic information.

The usual postures in examination by the usual method for diagnostic signs in appendicitis do not always elicit pain.

New combinations of posture and pressure methods successfully elicit pain where any trace of inflammation or adhesions remain.

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1851 Seventh Avenue.

Value and Limitations of the X Ray in the Diagnosis of Chronic Appendicitis*

By LESTER LEVYN, M.D., F.A.C.P.,
Buffalo, N. Y.

The evolution of the röntgen method has been so rapid in the last few years that it is at the present time one of the most efficient if not the most valuable single method of procedure in diagnostic achievement. This fact, however, is not sufficient reason to abandon other recognized means within our armamentarium. The patient who presents himself for examination should be given the benefit of not one but a combination of all the available methods whereby the percentage of error in diagnosis may be reduced to a minimum.

Frequently I am confronted by my medical and surgical confrères with the statement that the x ray rarely makes the diagnosis of chronic appendicitis which has not been previously established by clinical methods, that it is only of confirmatory value. If its usefulness were limited even to that extent its place would be firmly fixed. Knowing that often symptoms of chronic appendicitis are obscure and may produce their effects reflexly such as nausea, vomiting, vertigo, pylorospasm, hypersecretion and epigastric pain, I hope to show wherein knowledge is placed at our disposal concerning the appendix which we were quite unacquainted with in preröntgen days.

It might be of interest to state that Cignozzi of Naples in January, 1922, reported that "in five hundred surgical treatments for appendicitis, he had been able to observe in adolescents a particular clinical form of appendicitis whose objective symptomatology is marked by general nutritive dystrophia, an arrest of development and phenomena of infantilism. The histories and the subjective and objective disturbances would tend to show that it is the appendicitis lesion that brings about this condition of faulty nutrition and of arrest of development. In fact, appendectomy brings about the cessation of local disturbances and an immediate change in the organism in the direction of a normal somatic and genital development. The therapeutic criterion demonstrates absolutely the connection between cecoappendicular changes and general dystrophia because cure inevitably follows removal of the appendix." In so far as many of these changes can be observed only by means of their actual demonstration under the screen, many cases of dystrophia and infantilism could be prevented by the early recognition of cecoappendicular pathology.

The appendix can be visualized either normal or abnormal in at least seventy-five per cent. of cases. The method of choice is the administration of the ingested barium meal. By means of the opaque enema, the percentage of visualization is extremely small. The majority of observers feel that it can be seen at the termination of the sixth hour, but in my own work I have been able to demonstrate it only rarely at this time because the large amount of barium in the ileum obscures its shadow. I have been more successful in bringing it to view in upwards of the ninth hour and generally at the twenty-fourth. It is of utmost importance that a combination of both radiography (at times stereoscopic) and fluoroscopy be utilized because if films alone are used, omitting screen search, the organ may not be revealed.

The mere position of the appendix without other signs is of negligible significance. Most commonly, it is situated along the internal or median border of the cecum and not infrequently hidden behind the terminal ileum and its mesentery. According to Kelly, forty per cent. of appendices are hidden behind the ileocecal junction. This author also describes the various directions in which an appendix may point as follows:

1. Lateral to the cecum
2. Behind the ileocecal junction
3. In the iliac fossa
4. Along the iliac vessels
5. Into the pelvis
6. To the promontory of the sacrum
7. Among the small intestines
8. Mesial to the cecum over the ileum
9. Mesial to the cecum under the ileum
10. Behind the cecum

Fluoroscopic observation at varying periods of time following the ninth hour after the opaque meal shows that the appendix is not in a constant position but moves from one to another area. If, therefore, we rely upon a pressure sensitive McBurney point as always indicating chronic appendicitis, we are in many instances misled because the appendix may be in an entirely different location. McBurney, in 1889, in his masterful presentation of the subject, states, "I believe that in every case the seat of greatest pain, determined by the pressure of one finger, has been very exactly between an inch and a half and two inches from the anterior spinous process of the ilium on a straight line drawn from that process to the umbilicus. This may appear to be an affectation of accuracy, but, so far as my experience goes, the observation is correct." Röntgenology has proved that the McBurney point is not necessarily the landmark of the appendix and I feel quite certain our surgeons will agree that it is many times necessary to hunt for it in regions quite remote from the McBurney point. A pressure tender McBurney point may be due to conditions other than chronic appendicitis.

The sensitive appendix, the tip of which points upward, is generally of the adherent type.

Is the fact that the appendix can be visualized by the entrance of an opaque substance in itself of any importance?

Various opinions are entertained. Some continental observers regard the capability of its demonstration as evidence of disease. Case says, "It is to be presumed that when the appendix rids itself promptly of the bismuth mixed cecal contents, the fact of the entry into the appendix is of little consequence, but when the cecal contents are retained for several days, perhaps even weeks, one may certainly conclude that under favorable circumstances, when the fecal mass is especially rich in pathogenic bacteria, its retention within the appendix will be a matter of greatest importance. Hence, when the appendix remains visible for more than a day or two following bismuth examination, it is in proportion to its poor drainage, a dangerous appendix."

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*Read before Buffalo Academy of Medicine, May 3, 1922.

The results of our work have led me to place but slight stress upon defective drainage in itself. If we base the diagnosis of appendix pathology upon this occurrence alone, our surgical friends will not only disprove this statement but will become skeptical as to the real value of the röntgen method.

Motor insufficiency of the stomach is not uncommonly due to primary relaxation of the muscular walls brought on by overeating, too great a use of tobacco, irregular habits, the anemias, infectious diseases, gastroenteroptosis and chronic constipation. Why, then, is it not conceivable that prolonged retention in the appendix may be the result of similar etiological factors without there being any actual pathological changes in the appendix? When, however, hypomotility is accompanied by a pressure tender point elicited in the course of fluoroscopic or visible palpation, we have one of the most reliable signs indicating disease.

We have seen appendices after removal declared normal by surgeons, which retained barium for upwards of forty-eight hours, but were free of pressure tender points during the screen examination. In a word, prolonged retention minus sensitiveness we do not consider demands operative procedure and from subsequent histories in certain of the operated cases we find the various symptoms complained of have in no way been alleviated by the operation.

Ileac stasis is considered by some as constituting one of the röntgen signs of appendix disease. This is seen so often in individuals who have normal appendices and in many who have had their appendices removed that its occurrence does not carry great weight as a diagnostic point in this disease. In fact, most patients who are constipated show evidence of socalled ileac stasis due to back pressure from the cecum. Incompetency of the ileocecal valve occurs so commonly that we believe it only worthy of passing mention.

More important than ileac stasis or ileocecal incompetency is the phenomenon of pylorospasm, which may at times be induced by palpation of the appendix.

It is of the utmost importance to know that the vague stomach symptoms in appendicitis find their explanation in a socalled pylorospasm. We not only have clinical methods, but also x ray findings, which are called forth by a spasm of the pylorus.

In no way can we estimate the motor activity of the stomach so well as by an x ray examination, and the effect of pylorospasm can be read directly off the fluoroscent screen. Of course, this does not absolutely prove the presence of pylorospasm, but as near as can be judged, it enables us to assume its existence with the greatest degree of certainty.

In deciding whether the appendix is truly sensitive to pressure, the question of palpation is one of utmost importance and its technic must be carefully practised.

Most röntgenologists use the gloved hand or a wooden spoon called a distinctor. We have used both and discontinued them because the tactual sense is lost, supplementing them by using the lead-rubber glove from which the middle finger has been removed, thereby permitting the uncovered finger to be unencumbered and suitable for palpation.

In this manner direct pressure can be brought immediately over the appendix and its degree easily determined. With the gloved hand or distinctor it is not possible to palpate as gently as with the uncovered finger and tenderness may be induced by these protecting devices because much more pressure is brought into play than is realized. The degree of pressure with the one may elicit pain that is entirely lacking with the finger method. A large magnifying lens is often of great help in the fluoroscopic study.

It is true that by carrying out this technic the operator is negligent regarding his own protection, but the risk is no greater than that which the surgeon assumes who exposes himself to infection at the operating table or the clinician who comes in contact with various types of infectious diseases.

A visualized appendix that retains barium after the cecum has emptied, and is sensitive to visible palpation, is strong evidence of appendicitis. If drainage is defective for a number of days or weeks and a persistent pressure tender point exists, there can be no doubt as to the diagnosis.

The presence of adhesions can frequently be determined. If the appendix and cecum are freely movable, it is safe to assume that none are present. If the tip is adherent, it remains in a fixed position while the remainder can be made to move.

The entire appendix may be adherent in which case immobility is demonstrated unless it is bound securely throughout its entirety back of the cecum.

If the lumen is occluded, it is my belief that a pathological condition is present, since chronic inflammatory changes in themselves produce obliteration. Inflammatory exudate, constriction, concretions at the proximal end, or adhesions causing sharp angulation, prevent the entrance of the barium mixture.

If curling or kinking is seen, the examination should be repeated, always bearing in mind the liability of the appendix to change its shape. But, if the deformity is persistent, its production is likely due to pathology.

If the appendix appears to be constricted in one or more segments, reexamination is again indicated to prove the permanency of such defects and to rule out the possibility of the deformity being the result of peristalsis or spasm.

In comparing the degree of involvement in a large number of cases, in which the lumen was patent, with those of the nonpatulous type, I have found in following them to operation that more extensive pathological changes exist in the obliterative or nonpatulous type.

CONCLUSIONS.

Many symptoms are common to numerous abdominal conditions. The x ray is of value in their differential diagnosis, and most always is capable of eliminating certain organs and detecting the offender.

Obscure symptomatology may be due to unsuspected appendix disease discovered in the course of an examination of the gastrointestinal tract.

Tenderness over the McBurney point does not necessarily indicate appendicitis, because the appendix may be remote from this site. Its location can be determined by the fluoroscope.

An appendix that retains barium after the cecum has emptied is not necessarily diseased.

Size and position in the absence of certain signs are of scarcely any significance.

Leftsided appendix can be demonstrated by no other method.

Reiterating the röntgen evidence of appendix involvement we have:

1. A visualized appendix that is definitely sensitive to fluoroscopic palpation.
2. Inability to visualize the organ because of obliteration of its lumen together with the pressure tender cecum.
3. Persistent kinking or constrictions.
4. Concretions.
5. Adhesions.
6. Reflex pylorospasm.

494 Franklin Street.

Tuberculosis Within the Rectum

By CHARLES V. DRUECK, M.D.,
Chicago.

Tuberculosis within the bowel occurs rarely in the miliary form, but presents itself more commonly as ulcerative and occasionally as hypertrophic changes.

Miliary tuberculosis of the rectum usually is secondary to tuberculosis of the genital organs, more particularly the prostate, and begins with deposits which feel like bird shot beneath the mucous membrane. The mucosa is pale and anemic, except that immediately about the nodule where there is a ring of congestion. This stage may continue for a long time, but at any moment the little nodules may become yellow, caseate and break down into little, cuplike ulcers, which later coalesce to form large ulcers, or several small ulcers may be connected by burrowing underneath the mucous membrane.

Ulcerative tuberculosis is the more common expression of this disease in the bowel and is usually secondary to pulmonary tuberculosis. Infection begins in the solitary follicles and in Peyer's patches, but later spreads into large, irregularly shaped ulcers which follow the course of the bloodvessels. Thus, in the rectum these ulcers spread in all directions, while in the sigmoid they have a tendency to encircle the bowel.

The whole mucosa of the bowel is pale and anemic, except closely around the tubercle, where a ring of congestion appears. Later the tubercle gradually fades to a yellow color as caseation advances and finally breaks down into an ulcer with a ragged wormeaten base, surrounded by an infiltrated and indurated base which is sometimes undermined. In the necrotic base of the ulcer are seen little, yellow tubercles. These ulcers may extend all around the bowel and have little sinuses running beneath the mucosa from one ulcer to another. If the ulcers are close together the intervening bridge of tissue may slough away and thus a large irregular ulcer appears, perhaps extending entirely around the bowel. (Fig. 1.)

This necrosis may be confined to the mucosa and submucosa or it may extend to the muscular and serous coats but it rarely causes perforation. During this sloughing of tissue the various other bacteria of the colon add to the systemic poisoning. Beneath the ulceration is a deposit of fibrous connective tissue.

SYMPTOMS.

The local symptoms of tuberculous ulceration of the sigmoid or rectum are lumbar or sacral ache and rectal tenesmus, accompanied with diarrheal evacuations of pus, blood and mucus. The earliest symptoms of the coloproctitis, and showing the disturbed digestion in general, is the voiding of gas and mucus and an associated irregular colicky pain and abdominal distention. As soon as the tubercles break down, and erosion begins, blood is mixed with the mucus and discharges and severe hemorrhages sometimes occur when the ulceration erodes a blood vessel. If the bleeding is oozing in character it may be persistent and considerable blood be accumulated and retained within the rectum. The stools are diarrheal, dark in color from the added blood, and foul, gangrenous in odor. Sometimes the stools are partly formed and tarlike from the mixed blood.

Tenderness may not be present unless the peritoneum above or the sphincter region below is involved.

Stenosis and even obstruction may occur although death intervenes usually on account of failure of nutrition. The diarrhea is slight at first, but increases as the ulceration spreads, until thirty or forty evacuations occur daily. Bleeding is not profuse, but as the oozing is persistent the blood may accumulate and be retained in the rectum, and when voided may be fresh, or tarlike, or mixed with feces.

DIAGNOSIS.

Tuberculous ulceration of the bowel should be looked for in every patient when diarrhea occurs that cannot be accounted for by overeating or improper food, or by any other dietetic errors, and which does not promptly yield to treatment. A careful proctoscopic examination may fail to find the ulcers but when present in the sigmoid or rectum they are typical and easily recognized. Tubercle bacilli in scrapings from the ulcer are strong evidence of the nature of the trouble, although the possibility of accidental deposit of the bacilli on a nontuberculous ulcer must be remembered. The clinical picture is, however, somewhat characteristic: 1. The presence of tuberculosis elsewhere, as in the lungs, lymphatics, or the genitourinary system; 2, ulcers which follow the course of the bloodvessels and in the rectum spread out irregularly in every direction; 3, diarrhea, discharge of mucus, blood and pus with rectal tenesmus; 4, general emaciation of the patient with great loss of body fat. This may be expressed by the consumption of the perirectal fat and a shrunken or funnel shaped anus.

DIFFERENTIAL DIAGNOSIS.

The differentiation of a tuberculous ulcer from that due to some other irritation is essential. Theoretically this should be easy, but practically it is much more difficult, because often the classical symptoms are lacking or confused. It is probable that tuberculous ulceration of the terminal bowel (sigmoid and rectum) is much less frequent than is generally supposed. When patients with rectal ulceration become emaciated the conclusion frequently is that the process is tuberculous. Any ulceration in the lower colon produces dysentery which contributes to imperfect nutrition and the clinical picture of tuberculosis, but the character of the ulceration differs with each causative factor. Rectal ulcers of any type are intractable, and are therefore often believed to be tuberculous. Amebic ulcers may be mistaken for tuberculous lesions, but the amebic sufferer passes through many periods of symptomatic cure followed by sharp relapses, quite in contrast to the story of tuberculosis, which grows progressively worse. In amebic ulceration there is little variation of temperature and the pulse rate is increased only as exhaustion becomes pronounced. In tuberculous ulceration elevation of temperature and acceleration of the pulse rate are always present.

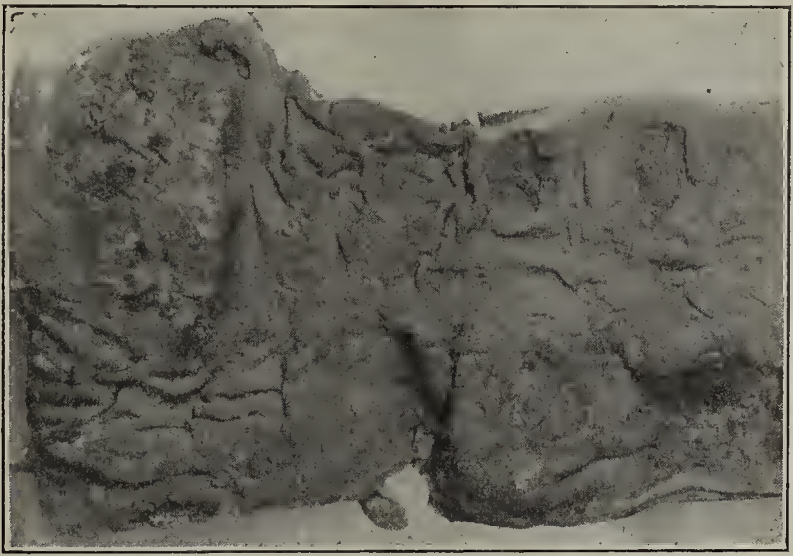

Fig. 1. Tuberculous ulcer of the sigmoid.

Cancer by the time it reaches the ulcerative stage fills the lumen of the gut and causes obstructive symptoms.

A syphilitic ulcer has a punched out appearance with raised edges, while the tuberculous ulcer is irregular in outline and has an uneven base (a worm-eaten appearance).

TREATMENT.

What has been said of the prophylactic treatment of tuberculosis at the anus will apply similarly here.

The same principles govern the active treatment of tuberculosis of the pelvic colon as apply to tuberculosis elsewhere in the body, that is, living in the open air as much as possible, particularly at night, little physical work or mental strain, and a highly nutritious diet.

Internal medication has very little influence except for relief of specific symptoms. Salicylate of bismuth is often required for the diarrhea. When the ulcers can be found with the proctoscope, they should be cocainized and then cauterized with pure crystals of permanganate of potassium.

HYPERPLASTIC TUBERCULOSIS.

This type of tuberculosis is characterized by the formation of a dense hypertrophy instead of caseation and necrosis, and may be confused with syphilis or scirrhous cancer of the bowel. The existence of tuberculosis elsewhere in the patient should put the physician on his guard.

SYMPTOMS.

A proliferating stenosis, with great thickening of the wall of the bowel and including the peritoneum, develops, instead of the ulcerating cavities found in the ulcerative tuberculosis of the bowel. These lesions are found in the cecum and appendix, as well as in the sigmoid and rectum. The patient has the same diarrhea, tenesmus, sacral pain and rapid loss of weight as in the ulcerative type of tuberculosis, although as the stenosis develops there is a gradually increasing constipation with the passage of mucus and later also pus and blood.

This hyperplastic form of tuberculosis is frequently mistaken for cancer or diverticulitis, and is only differentiated by microscopical examination. Lartigan (1) states that it is purely a local tuberculosis as the lungs and other organs are rarely involved. Lynch has also found this type of tuberculosis as a primary lesion in the sigmoid and rectum.

Treatment of hyperplastic tuberculosis consists in the surgical removal of the diseased area using the cautery instead of the knife, and following this with the usual upbuilding course as in any form of tuberculosis. The use of tuberculins is gaining in favor but the proper method of administering them is most important so as not to produce a negative phase.

Because rectal tuberculosis is secondary to this same infection elsewhere it is usually the lesser complaint, and the patient succumbs to the primary trouble before stricture of the bowel becomes severe; but in some instances obstructive symptoms are present. If stricture occurs, a removal of the diseased part of the bowel by resection is the only treatment.

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Gastric Ulcer and Suprarenal Hypofunction.—E. Martinez (*Aragón Médico,* January, 1922) concludes that in those having adrenal insufficiency there is manifested a vagotonicity, probably due to hypoadrenalinemia; that there exists at the same time a predominant activity of the lymphatic system with proliferation on the part of the lymphatic ganglia of an intensely vagotonic character; that resistance to infection is low; that the marked vagotonicity creates a condition favorable to development of gastric ulcers.

A New Type of Drain for Use in Anorectal Fistulæ

By J. F. MONTAGUE, M.D.,
New York,
Rectal Clinic at University and Bellevue Hospital Medical College, Fellow of the American Proctologic Society.

In the postoperative treatment of fistulæ lies the secret of their cure. For regardless of how painstaking a surgeon may be at the time of operation, if he is not efficient in the guidance of the healing process troublesome pus pockets, bridges of tissue, and innumerable complications are likely to occur.

It has been customary to treat fistulæ after operation by packing with gauze strips. Thus, by keeping the edges of the operative wound apart, granulation of the bottom of the wound is induced and allowed to progress until the area is entirely filled in. In this manner the healing occurs from the bottom up and the dangers of recanalization, bridging, and so forth are avoided. While the theory of this is ideal its practice often appears rather difficult. The reason that I have ascribed for this is that the material used for the pack, or drain as I prefer to call it, has certain deficiencies.

The proper dressing of a fistula wound of any considerable size with the ordinary gauze drain requires an appreciable amount of skill. The gauze drains are, of course, light and frail and, moreover, when packed in tubes, acquire a certain springiness and tendency to curl. All of these qualities render their manipulation more or less difficult. I do not believe gauze drains are very efficient for conveying medication nor do they stay in position particularly well. Then, too, when granulations begin to form they frequently grow into the mesh of the gauze and when this is removed the granulating tissue may be damaged and bleed profusely.

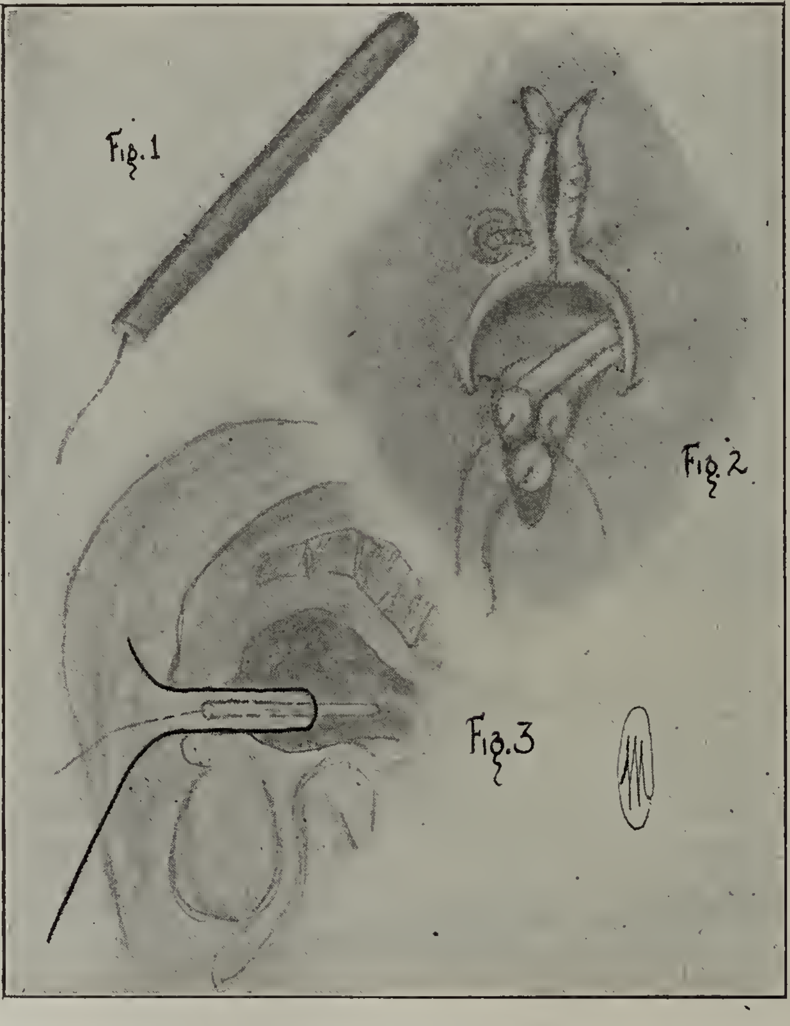

FIG. 1. Roll of absorbent cotton, quarter of an inch in diameter, to be used in author's drain for anoretcal fistulæ.
FIG. 2. Application of the fistulæ drain.
FIG. 3. Insertion of drain through a small sized endoscope.

In an endeavor to find a material or device which would obviate the shortcomings of the gauze drains just described, I contrived the following fistula drain which has given very great satisfaction in the University and Bellevue Hospital Medical College Rectal Clinic, at the Lexington Hospital, and in the hands of several other surgeons in this city to whom I suggested such drains for trial.

They consist, essentially, in a roll of absorbent (Fig. 1) cotton quarter of an inch in diameter and either four, six, or eight inches in length. Through the centre of this roll is run a piece of stout tape which extends beyond the roll for about three inches. The object of the latter is to serve for traction when it is desired to remove the drain, the cotton itself becoming very friable when wet. These rolls may be saturated with whatever medication it is considered desirous of applying to the fistulous wound, such as balsam of peru, Dakin's solution, argyrol and so forth. More medication may be conveyed in this manner than with the gauze drains and in addition the cotton rolls give up the medicaments more readily. Should one drain be insufficient to keep the walls of the wound apart two or three may be used. The roll drains are small enough in diameter to allow three or more to be placed in a wound without causing so much pressure that granulation is impeded or reunion of the sphincteric fibres prevented.

APPLICATION OF DRAINS.

The application of the drains I have suggested is very easy and may be done with either a bivalve speculum, such as a Bodenhamer, with the aid of a pair of anatomical forceps and a blunt rod (Fig. 2), or else a drain may be inserted through a small sized endoscope, the latter being withdrawn leaving the drain in the anal canal (Fig. 3). By gentle traction and guidance with a blunt rod the drain is placed into the fistulous wound.

The advantages of this type of drain are many and once they are used the old type of gauze drain becomes obsolete in fistula cases. They are easily placed and retain their position very well. Moreover, they are easily withdrawn by a little gentle traction on the tape. They do not adhere to the granulation tissue, nor do they leave cotton fibres in the wound as gauze occasionally does. They drain much better than gauze does and also, owing to their shape, act far more efficiently than gauze does in keeping the wound walls apart. Infection never occurs in a wound where pocketing and bridging are prevented. This to my mind renders them much to be preferred to gauze drains which occasionally permit tissue bridges to form. Finally, the fistula drain I have devised may be easily sterilized and kept so in sterile jars. Each one is handled individually, which makes the possibility of contamination less than in gauze strips that are cut off anther piece. Although attempts at sterility may seem futile when one works in the region of the rectum, I firmly believe that aseptic surgery, in so far as is possible, is just as much in order here as elsewhere.

540 Park Avenue.

An Instrumental Aid to Sigmoidoscopy

By DESCUM C. McKENNEY, M.D., F.A.C.S.,
Buffalo, N. Y.

The value of the sigmoidoscope for the inspection of the lower twelve inches or more of the colon is conceded; and, knowing the frequency of disease in this portion of the bowel, no routine examination of a patient is complete unless such an examination is made. In this way the cause of the patient's trouble is often determined by finding an unsuspected cancer, ulcer, polyp or stricture. No surgeon has any right to operate on a lower rectal or anal condition until he has convinced himself that the bowel is free from pathological conditions higher up.

There are many kinds of sigmoidoscopes. Each has an obturator, which makes possible its easy insertion through the anal canal into the lower rectum, at which point the obturator is removed and the instrument is then passed onward, under the guidance of the eye, with the aid of direct or reflected light. The pneumatic sigmoidoscope is designed to keep the bowel in advance of the distal end of the instrument, out of the way by inflating it with air. This, in some cases and often where most needed, does not work, as lack of tone of the external sphincter ani muscle permits the air to escape around the instrument so that distention is not possible. Other operators pass the sigmoidoscope as far as possible, withdraw the obturator, and with the eye observe what they believe to be a continuation of the lumen, into which, after replacing the obturator, they endeavor to advance the instrument, proceeding in this manner until they have accomplished their purpose. Sometimes, after the sigmoidoscope has been passed into the rectum, it can be advanced, if done gently, without the obturator and without injuring the mucous membrane, providing the edge of the distal end of the instrument is blunt.

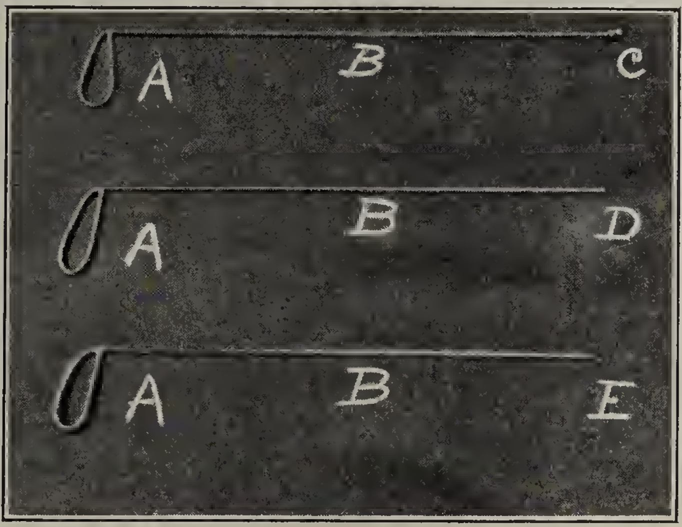

Fig. 1. Parts: a pistol grip, b shaft, c acorn tip. The pistol grip and shaft are made from one piece of brass rod, 5/32 inch in diameter, and the acorn tip is ⅜ inch in diameter with the large end of the acorn distal. When one uses a sigmoidoscope with a small lumen the acorn tip will to some extent obstruct the view, so the instrument may be made without this tip but with the end of the rod, which should be 3/16 inch in diameter, rounded bluntly, D. It is often advantageous to have ⅜ inch of the tip bent at an angle of 155° with the shaft E.

No matter what sigmoidoscope or method of passing it is used occasionally unusual difficulties present themselves. It is with the idea of surmounting these difficulties, as far as possible, that the instrument about to be described has been devised.

USE OF THE INSTRUMENT.

The knee chest and Hanes's positions are the best for sigmoidoscopy. With the distal end of the sigmoidoscope, preferably one with a bluntedged end, inserted into the rectum, the obturator is withdrawn and the described instrument, which may well be called a pathfinder, takes its place. Perfect vision is assured by means of two features in the pathfinder, one being the pistol grip which permits the hand manipulating the instrument to operate at one side of the proximal opening of the sigmoidoscope, and the other being the small size of the shaft which occupies practically no room inside the tube. When the operator sees what he believes to be the lumen he passes the acorn tip into it, if it will go; if not, by withdrawing slightly or otherwise shifting the end of the sigmoidoscope another suspected continuation of the lumen is brought into view, and, if the tip passes into it, it is advanced as far as it will go without using any force. Then the sigmoidoscope, now that the way has been found, is slipped over the pathfinder to its end. The same maneuvre is repeated as frequently as necessary to complete the examination.

Helpful in the passage of the instrument is to have the patient breathe deeply. Gentle manipulation of the abdominal wall during the examination often dislodges the pelvis colon from the pelvis and straightens it so the instrument can be more easily advanced. Gentleness to avoid spasm is always essential.

Inasmuch as one can always see what he is doing there is no danger of puncturing the bowel with this instrument.

In addition, by using this instrument as the finger is used for palpation, one is able, among other things, to estimate the amount of bowel spasm, the size of the pedicle of a polyp, the amount of induration about a growth or ulceration and whether or not there are adhesions.

1250 Main Street.

Duodenal Intestinal Obstruction, Secondary to Gastric Polyp and Intussusception Due to Multiple Teniæ Saginatæ*

By JOHN W. SHUMAN, M.D., F.A.C.P.,
and DOUGLAS CRUIKSHANK, B.A., M.D., C.M.,
Beirut, Syria.

Comment concerning the failure of the colon to rotate during embryonic life needs only passing mention in this instance because it is not a rare happening.

The fact that five distinct heads of bovine tapeworms were found, at autopsy, anchored in the mucosa of the first portion of the ileum, demonstrates clearly that textbooks are somewhat misleading in that they leave the reader with the opinion that one and only one tapeworm inhabits the intestinal tract of man at a time. Statements by Dr. Adams, the former, and Dr. Webster, the present, director of anatomy here are definite in stating that they have frequently found multiple teniæ saginatæ in cadavers. However, this is the converse of the solitary worm of pork tenia solium.

The intestinal obstruction is worthy of record because its cause, location and action were unique. The lethal result was inevitable for, when admitted to the hospital, the patient was moribund.

The cause was a new growth springing from the stomach wall just inside the pylorus, which acted like a plug in the first portion of the duodenum causing a spasm about it, and permitting it with the surrounding gut to slip into the next portion of the intestine, an intussusception, with hypertrophy of the gut below. An abbreviated history and autopsy report follows:

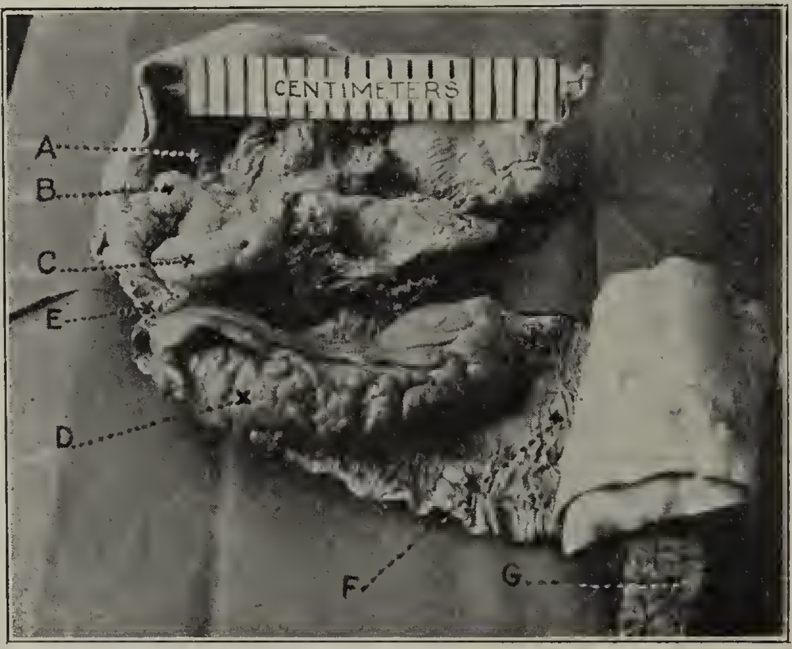

Fig. 1.—A. Normal rugæ. B. Hypertrophied rugæ. C. Smaller polyp. D. Larger polyp. E. Pylorus (unopened). F. Hypertrophied and dilated duodenum and jejunum. G. Normal small intestine.

Case I.—No. 17591. Female, aged thirty-five, was referred by Dr. H. G. Dorman to the medical service of the American University Hospital at 6 p. m. November 14, 1922, complaining of "vomiting one half hour after taking anything into the stomach, which began five weeks before, after lifting a heavy object and drinking copiously of water. A doctor was called who prescribed an anthelmintic, which resulted in the passing of a worm. Getting steadily weaker on account of not being able to retain food and bowels moving scantily every two or three days."

Physical examination evidenced a markedly emaciated and prostrated woman. Her abdomen was moderately distended. Peristalsis was visible from left to right. Tympanitis was elicited from the xyphoid to three fingers' breadth below the umbilicus. The lower border of this tympany had its convexity downward (stomach?). A long, round, hard mass felt in the right abdomen extending from the iliac fossa up to and under the costal margin. This was thought to be the cecum impacted with feces.

Prognosis notes under date of November 15th stated that repeated enemas (seven) were given, all but two attended with only fair results—hard, fecal masses, segments of teniæ and some dark blood. Death occurred on November 16th at 9 a. m. and autopsy followed at 9:30 a. m. the same date.

An abdominal incision opening into the stomach was made (which appeared to fill the whole upper abdomen) and liberated from one to three litres of clear, colorless fluid. A large sausageshaped mass, that was apparently small intestine, lay along the right side of the abdominal cavity. The cecum with the appendix in front of it, lay in the left iliac fossa. The appendix was white and firm and the proximal end distended to the size of a lima bean with hard masses that grated together like stones on being handled.

The colon contained a small amount of thick red fluid suggesting altered blood. The ileum was of normal size and contained a greater amount of this red fluid and in addition larger masses of live tapeworm, from among which five heads were isolated (teniæ saginatæ). The jejunum was greatly hypertrophied and within its proximal lumen there was a gangrenous mass of tissue. This and the duodenum formed the sausageshaped mass referred to above. The duodenum was opened and this mass traced upwards. It was a greatly congested, lobulated polyp ten inches in length and two and one half inches in diameter attached within the stomach to the anterior surface just proximal to the pylorus (Fig. 1). Another polyp about three inches in length extended from beside the larger one into the duodenum. The smaller polyp was greatly congested but not gangrenous. The rugæ of the stomach were marked and one was especially hypertrophied and apparently in process of becoming larger like the polypi just described. These polypi were apparently formed entirely from the mucous lining of the stomach and did not seem in any way to have thickened or infiltrated the submucous layers of the stomach wall. The stomach was enormously dilated. The pyloric end had become invaginated into the duodenum to form an intussusception three inches in length. The peritoneal coverings of this area had become firmly adherent where in contact. The opening of the bile duct was patent within this area of intussusception. Gangrene had occurred only on distal end of largest polyp. Microscopic section from middle of largest polyp showed it densely infiltrated with small round cells. Bloodvessels were numerous and congested with red cells. Superficially there was ulceration. There was moderate hyperplasia of racemose cuboidal epithelium, confined to a definite superficial layer of the tumor and not infiltrating the deeper parts. The glandular cells were regularly arranged on a basement membrane with deeply staining nuclei at the base. Many of the acini were filled with desquamated degenerating cells. There was no suggestion of malignancy in the epithelial tissue.

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*Read at the fortnightly meeting of the American University of Beirut Pathological Society. November 20, 1922.

The underlying tissue, which constituted the great bulk of the tumor, was hyperplastic connective tissue consisting of irregularly arranged masses of oval, spindle shaped and oat shaped cells lying in the matrix which had the character of a fine network of edematous fibrin. The nuclei of the cells stained faintly and the cytoplasm was granular. Few mitotic figures were seen. Embryonic connective tissue, nonmalignant, was present.

CONCLUSIONS.

1. That the cause of death was starvation secondary to duodenal obstruction from a nonmalignant polypoid growth.
2. That early operative interference might have averted death.

Thrombosis of the Superior Mesenteric Vessels and Volvulus of the Small Intestine. Resection and Recovery*

By DAVID H. ORGEL, M.D.,
New York.

The infrequent occurrence of this condition and the small number of cases reported add interest to the case reported herewith. Whether the thrombosis of the mesenteric vessels was primarily and the volvulus secondary, or vice versa, cannot be determined. In an exhaustive résumé of the entire subject Klein (1) admits that either condition may be primary or secondary.

CASE.—A. U., male, aged nineteen, was admitted to the City Hospital on January 11, 1923, at 10 a. m. His previous history was negative; his bowels were regular and he had no pains in the abdomen. His present illness began on January 10, 1923, the day before admission to the hospital. After dinner, at noon, he had gone for a walk and was suddenly seized with pain in the abdomen. He took a dose of castor oil, but this did not relieve the pain and he commenced to vomit. Pain and vomiting increased and at 6 p. m. he called a doctor who prescribed some medicine which did not relieve either pain or vomiting. Three enemas were given with no result, except for the return of clear water. No blood was passed per rectum. The doctor was called again at midnight and gave him a hypodermic of morphine. He was unable to sleep, however, the pain and vomiting continued, and he was removed to the hospital in the morning.

Physical examination on admission showed the patient in a state of shock. He looked weak, his pulse was 160, respirations were rapid, temperature was 99.2° F., and he was in great pain. Physical examination was negative except for the abdomen. There was marked generalized rigidity of the whole abdominal wall with tenderness throughout, increased in right iliac fossa. The abdomen was protuberant and distended. The diagnosis on admission was acute appendicitis with general peritonitis.

On opening the abdomen through the right rectus incision a large amount of bloody fluid escaped. Several coils of the small intestine from about six inches above the ileocecal valve were deep chocolate brown in color, twisted upon themselves, and some coils were twisted through a rent in the mesentery which was dark in color and friable. The mesenteric vessels were thrombosed and did not bleed when cut across. The gut was thickened and indurated and showed a sharp line of demarcation at either end from the healthy intestine. Seven and a half feet of small intestine were removed (without untwisting coils) and an end to end anastomosis made with the Murphy button (on account of the necessity for rapid work) reinforced with two rows of Lembert sutures. The thrombosed vessels were ligated, mesentery was tied off distal to the thrombosed area, stumps of vessels covered with perotineum and ends of mesentery approximated. The abdomen was washed out with normal saline solution and, filled with it, then closed by layer sutures without drainage.

The patient had a stormy time for a few days. Gas was passed by rectum on the second day; bowels moved normally on January 16th, fifth day; the Murphy button was passed by rectum on the seventh day; stitch abscess of the abdominal wall developed on January 21st, which healed. He was discharged on February 4, 1923, cured.

The chief interest of this report lies in the large amount of intestine affected by the thrombosis, its resection, and the recovery of the patient. This was due in a large measure to the early recognition of the acute abdominal condition, the patient's removal to the hospital, and immediate operation. I believe from the operative findings, that is, occlusion of the bloodvessels and the condition of the mesentery, that thrombosis of the mesentery vessels was the primary cause of the condition. The etiological factor I was unable to determine.

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*Service of Dr. Howard D. Collins, City Hospital.

Editorial Articles

THE BLOOD IN GASTROINTESTINAL MORBID PROCESSES

With the exception of the esophagus, the rectum, and a portion of the sigmoid, it is still often impossible to affirm the development of a lesion of the gastrointestinal tract; hence the means offered by the laboratory for diagnostic purposes should be resorted to, and among these, hematology.

From a general viewpoint, a decrease of the red cells and a lowering of the percentage of hemaglobin are constant in chronic infections and hemorrhagiparous affections and cancer. The anemia will be all the more marked, the more serious the morbid process. Leucocytosis is a vulgar datum, nevertheless it may be said that the degree of leucocytic reaction depends upon the nature of the infection, its gravity and development, the patient's resistance, the complications, and all morbid associations.

Polynuclear leucocytosis is a normal reaction in acute affections; a sudden rise of leucocytosis above thirty thousand is an important presumptive sign in favor of an acute peritoneal reaction. In chronic affections a polynuclear leucocytosis may indicate a lesion of the stomach, duodenum, gallbladder, or large intestine, sufficiently profound to reach the peritoneum and to provoke a plastic reaction of the serous membrane in the region of the lesion.

A mononuclear leucocytosis is met with in about fifty per cent. of the cases of cancer of the digestive tract at its onset, and it is constant in chronic appendicitis. The large mononuclears predominate in gastric and duodenal ulcer, gastric cancer and chronic appendicitis. Medium sized mononuclears and lymphocytes predominate in fifty per cent. of the cases of gastric cancer, syphilis of the liver, and in forty per cent. of the cases of appendicitis. Eosinophilia accompanies parasitic invasion, rectal cancer and serious forms of colitis, which may also be of parasitic origin.

From the local viewpoint, when a gastric lesion exists, the anemia is quite as marked in a bleeding ulcer as in cancer. It is not marked in gastric syphilis. Leucocytosis is *nil* in ulcers, more marked in syphilis, and still more so in cancer, where the polynucleosis attains a high degree in fifty per cent. of the cases, mononucleosis in thirty per cent. and a normal count in twenty per cent. There is a moderate mononucleosis in gastric syphilis, the large mononuclears predominating. Duodenal ulcer offers the same hematological changes as gastric ulcer.

Anemia is very marked in the diarrhea of tuberculous enteritis, while if a diarrhea is due to intestinal parasites or a latent amebiasis, eosinophilia is present. The count is normal in nervous diarrhea. All infections of the liver and biliary tract give rise to distinct polynuclear reactions, while a marked eosinophilia is present in cysts and amebic abscess of the liver. Colonic cancer invariably causes a polynuclear leucocytosis, while in rectal cancer the blood changes are the same as in gastric malignant processes.

AZOTEMIA AND GASTRIC ULCER

The recent work of LeNoir and his coworkers has drawn particular attention to the secondary reaction of gastric affections on the kidney. Rendu, although not maintaining that uremia depended upon a gastric lesion, drew attention some time ago to the possible superposition of these two processes, which have no common pathological bond, and from this fact he demonstrated the difficulty of making a differential diagnosis between cancer of the stomach and gastric uremia, since both affections could be encountered in the same patient. Treitz has reported similar cases of gastric ulcer and uremia, Barié uremia and duodenal ulcer, Lancereaux uremia and ulcer of the large intestine.

This morbid combination is, however, an infrequent pathological phenomenon and should lead the practitioner to search for the organic gastric lesion and what Le Noir, Richet and Jacquelin have demonstrated conclusively is that it is not merely the superposition of the two processes but the dependence of the renal lesions on the gastric lesions. Because their researches have not only been of a pathological nature, but above all clinical and biological, it may be more exact to say that there is dependence of the functional renal disturbances on the gastric ulcer, this being the inverse of most cases in which gastric disturbances depend upon renal lesions and the uremia resulting therefrom.

Let it be understood that the condition under consideration is in no way related to dyspeptic albuminuria. Clinically, the nephritis due to gastric ulcer rarely gives rise to albuminuria and edema and there is no high blood pressure; it manifests itself especially by a mild azotemia amounting to fifty or sixty centigrams and an increased Ambard coefficient. In a word, the nephritis develops silently during the progress of the ulcer and will be detected only by biological reactions.

In thirty-eight cases of gastric ulcer in which azotemia was searched for, Le Noir and his coworkers obtained the following interesting results: In fifteen cases with azotemia, this amounted to fifty to sixty centigrams; in six cases from sixty centigrams to one gram in five; from one to two grams in three and over two grams in one case. Ambard's coefficient gave concording results.

Gastric ulcer cases, therefore, frequently present azotemia. This appears to be more common in ulcers of long standing than in those of recent date, and nevertheless elderly patients seem to be more predisposed to it than younger subjects, and, what is more, the azotemia appears to be progressive in type.

These are not mere speculative statements; they admit of useful prognostic and therapeutical indications because these renal lesions, which are generally associated with hepatic lesions and are usually latent, manifesting themselves by humoral changes, nevertheless constitute a relative contraindication to operative procedures necessitating a general anesthesia.

SHOULDER PAIN IN THE DIAGNOSIS OF ACUTE ABDOMINAL PROCESSES

The recent studies of Mr. Z. Cope, of St. Mary's Hospital, London, are of considerable clinical interest. Phrenic shoulder pain varies considerably both in intensity and quality, it most commonly resembling an ache, and is regarded by the patient—and not infrequently by the physician—as a rheumatic pain. Sometimes it is very sharp and stabbing, or it may feel as if a nail were being driven in at the painful spot. Frequently the discomfort occasioned may not be sufficiently severe for the patient to complain of it, hence it is necessary to inquire about the pain in every case if one is to avoid overlooking the symptom. Some patients say they have no pain, but that there is a sensation of stiffness in the affected part. This pain is of diagnostic value in a number of acute abdominal processes.

Perhaps hepatic abscess gives rise to this symptom more often than any other abdominal affection and both Waring and Cope have reached the conclusion that shoulder pain accompanying abscess of the liver is seldom or never experienced unless the pus is threatening to perforate the diaphragm. Hence, in any case presenting symptoms of hepatic abscess, accompanied by shoulder pain, the abscess must be close to and irritating the diaphragm. It should be likewise stated that this pain may be the only symptom calling attention to such an abscess.

Phrenic shoulder pain is an important symptom in perforated gastric and duodenal ulcer. Though not invariably present, it is sufficiently constant for inquiry in every acute abdominal case. Sometimes the referred pain arises simultaneously with the abdominal, but occasionally it is delayed in onset.

With the perforation of a duodenal or pyloric ulcer the pain is usually felt in the right supraspinous fossa or over the right acromion process, less commonly just above the right clavicle. With an anterior perforation of the stomach the pain is more likely to be referred to the region of the left clavicle or left acromion process. If the perforation is near the cardia, and the escaping contents irritate the median portion of the diaphragm, pain may be felt over both acromioclavicular regions, while a sense of weakness in the upper arm in addition to the shoulder pain may be complained of, this perhaps being due to a reflex action occurring in the sensory fibres of some of the arm muscles.

It is, perhaps, not generally known that phrenic shoulder pain is present at some time or other in the evolution of nearly every subphrenic abscess, but generally is complained of only in the stage of active formation of the abscess. When once the abscess has become localized, probably no complaint of the shoulder pain will be made. The position of the referred pain varies according to the position of the pus collection.

Any inflammatory condition spreading from the gallbladder may cause phrenic shoulder pain. Acute cholecystitis does not cause it until the inflammation has extended beyond the confines of the viscus. The passing of a stone down the biliary ducts is not accompanied by this referred pain unless there is inflammation around the ducts. Rupture of an infected gallbladder may cause the significant pain. In gallbladder processes the pain is generally referred to the right supraspinous fossa, occasionally to the acromiodeltoid region.

Slow enlargements of the spleen do not lead to diaphragmatic irritation and its characteristic pain, but the local peritonitis consequent to a splenic infarct, and the irritation caused by collecting blood clots, are sufficient to produce the symptom.

On *a priori* grounds, Cope had supposed that acute pancreatitis should, by irritation of the left crus of the diaphragm, lead to phrenic shoulder pain and in one instance of this affection the patient emphatically stated that at the onset of the agonizing abdominal pain there was also pain in the left supraspinous fossa, which was relieved when the abdominal pain was relieved.

It is seldom that phrenic shoulder pain is a symptom in appendicitis, because it is infrequent for the infection to extend up to the diaphragm. With a long ascending appendix, however, or in cases where the cecum and appendix are much higher than normal, the symptom is to be expected, but it is rarely found in practice.

Clinical evidence supports the view that the position of the referred pain on the top of the shoulder varies according to the part of the diaphragm irritated. This conclusion is at variance with that reached by Capps as the result of his experimental irritation of the diaphragm in cases of pleural effusion. It is possible that the different results may be due to the difference between a mechanical stimulus and that due to inflammatory conditions.

All observers agree that irritation of the right side of the diaphragm causes pain on the right shoulder while left shoulder pain arises from some affection of the left portion of the diaphragm. The localization may be summarized as follows: Irritation of the anterior part of the diaphragm causes pain in the corresponding clavicular or supraclavicular regions; irritation of the posterior portion of the diaphragm causes pain in the supraspinous fossa of the same side: irritation of the top of the phrenic dome causes pain in the corresponding acromioclavicular regions, and finally, pain felt over both shoulders indicates a median diaphragmatic irritation.

THE HUNT FOR SPIROCHETES

The American literature upon general paresis receives an interesting contribution through Dunlap's report on localization of the spirochete. (Charles B. Dunlap: Recent Studies on Spirochetes in General Paralysis. *Archives of Neurology and Psychiatry,* December, 1922). He reviews the latest findings in this phase of the subject from European investigators, especially in Germany, estimating these also from his own researches. He mentions the new staining method of Jahnel which has enabled the latter to define the spirochete sharply leaving the nervous elements unstained. This has given opportunity for a more systematic hunt for the organism in its distribution and method of activity in the nervous tissue.

Spirochetes are most readily found in the frontal lobes, the seat also of their greatest ravages. Here it is chiefly in the middle and deeper layers of the gray matter where they are to be found, seldom in the pia or in the outer cortical layer, almost never in the white matter. They seem to lie along the fissures and at the tops of the convolutions. They appear in three types of distribution most frequently in wide diffusion but in small numbers. Yet they are sometimes grouped in foci containing even a perfect swarm of the organisms but showing no special relation to any particular nervous elements. At other times these foci have concentrated themselves around the vascular walls even penetrating them. They have practically never been demonstrated in the blood or cerebrospinal fluid of a human being in life although in this vascular focal form rarely a spirochete is found in the lumen of the vessel. It is believed that these focal colonies gravitate from the parenchyma toward the bloodvessels, never from the blood stream to the parenchyma.

It is important that investigation shall be made as soon after death as possible for the spirochete having marked viability changes its position rapidly apparently invading portions of the body inaccessible during the life of the host. The increase and decrease of the number of spirochetes seems to alternate in wavelike recurrences and to be most in evidence in cases with a stormy course. Death following some acute attack of this nature gives the greatest likelihood of finding of spirochetes. The changes found in the brain are not to be considered the result of this temporary spirochete activity but the result of a repetition of its activity perhaps for years.

Dunlap discusses necessarily without definite conclusion the manner of invasion of the brain by the spirochete and the possibility of a special neurotropic form of the organism as the cause of general paresis. He refers to Ehrlich's theory that the spirochete enters the meninges as well as other bodily tissues at the time of first infection but there is subjected to successive resistance by antibody formation so that the surviving organism which later produces the general paresis has become biologically altered and confined to circumscribed foci. There is no evidence at hand to prove that the spirochete of general paresis is a special neurotropic organism at the start. If it is true that the biologically modified spirochete has a heightened resistance then a modified form of treatment may be necessary for it. It is emphasized that much more attention is due the soil in which the spirochete grows than its possible specifically neurotropic character. This attention to the individual in which this form of syphilitic disorder takes root is quite in accord with the present trend of medicine.

AMEBIC ABSCESS OF THE LIVER

Interesting clinical studies have been carried out recently by Bressot in amebic hepatic abscess and since amebiasis is becoming an autochthonous disease in Europe since the war, the subject is important.

The diagnosis of amebic infection of the liver is difficult on account of the many clinical varieties encountered. Besides the acute hepatitides presenting the classical picture found in textbooks, there are those having a torpid, insidious evolution, while in others the progress of the hepatic infection is concealed by quite different morbid localizations. The absence or the presence of the classical clinical symptoms are not sufficient for affirming or eliminating the diagnosis, as they do not possess the absolute value which observers have attributed to them.

Positive examinations of the feces show the presence of amebæ or cysts in forty-five per cent. of the cases. Out of a total of twenty-five cases, in five there was localized pain in the liver produced by pressure with the hand, in twelve the pain extended to the right shoulder, and in eight there was no pain.

Hypertrophy of the liver is often overlooked in the case of a small abscess, while other than in large pus collections, the enlargement is the result of the accompanying congestions of the organ. Frank icterus is not met with, but a mild yellow tinge of the integuments is not uncommon. The temperature may be high, with marked oscillations, and in some patients it may be normal.

Blood changes are more likely to be absent, the hematological syndrome being variable. However, a marked polynucleosis from seventy per cent. to eighty per cent. appears to be a bad element in the ultimate prognosis. The reaction of urobilin in the urine is not to be relied on, as it is absent in small liver abscesses and is constantly present only in large pus collections.

Radioscopy should invariably be resorted to. In the normal state the diaphragmatic dome is two centimetres higher on the right side, while it may reach from six to ten centimetres in suppurating hepatitis. There are other well known radioscopic signs which may aid in making the diagnosis.

But exploratory puncture is the only means at our disposal for affirming the diagnosis of suppurating hepatitis. In small pus collections several punctures will probably be required until the needle reveals pus. The needle should be at least ten to fifteen centimetres long with a calibre of not less than one millimetre, and if a painful area exists the needle should be thrust in at that point. Otherwise, the entire hepatic region must be explored, not overlooking the posterior region as is frequently done. The characteristic chocolate or brick red color of the pus will eliminate the diagnosis of metastatic abscess, infectious angiocholecystitis, areolar abscesses and suppurating hydatid cysts. The presence of glucose in hepatic pus in an excellent diagnostic element.

The great elements of success in the treatment of hepatic abscess are early diagnosis and surgical intervention. Emetine can prevent abscess formation only when exhibited during the phase of congestion, that is to say, at the very onset of necrosis, and it should be exhibited after the abscess has been opened and drained surgically.

RESTING THE LUNG

Rest is the most important factor in the cure of active disease, but the disease in which rest of the affected organ is most needed—tuberculosis—is, unfortunately, the one in which it is most difficult to obtain. General rest of the tuberculous patient in the recumbent position produces part of its good result by reducing the need for oxygen to a minimum and, so, the frequency and degree of expansion of the lung. The production of an artificial pneumothorax is a bold attempt to give local rest to at least one lung, and it has had a pretty thorough trial. It has proved of great benefit in a considerable percentage of selected cases where careful technic was employed. There is frequent complication by pleuritic effusion or by empyema, but in desperate cases these risks are worth taking. Another disadvantage is that the treatment must be carried out over a long period of time with instillations of air every ten days or so. Then, the presence of adhesions in the pleura may interfere, and need to be severed before collapse of the lung is accomplished. Altogether it is a most troublesome method, even in skilful hands.

The resection of a piece of a few ribs, or of all of them, on one side, with or without compression of the apex, additionally, by tucking a part of the pectoral muscles into the thorax, has accomplished much in some cases.

Lately, a new method of resting the lungs, or, presumably, the apices of the lungs, has been suggested —that of diaphragmatic and infrequent breathing. It is possible for one to reduce the number of his respirations from sixteen a minute to as few as four or five. Probably little is accomplished by this reduction in rate, since, when one does breathe, he must take in a proportionately greater amount of air, but in this new treatment the patient is instructed to control the upper respiratory muscles and uses only the diaphragm.

In practice such breathing is tried at intervals for short periods, increasing the socalled dose day by day. It requires good teaching, and much will power on the part of the patient, but it is at least of advantage in that it gives the patient something to do, and this means everything to the bedfast sufferer from tuberculosis.

Diaphragmatic breathing doubtless gives the apices some rest, but whether the infrequency has any advantage is not so apparent. Certainly this new treatment will do no harm, and it would seem to be of benefit to practice diaphragmatic breathing with or without reducing the number of respirations. Many sanatoria are now trying this new means of cure, or contribution toward a cure, and the results will be looked for with great interest.

THE UNITED HOSPITAL FUND—WHAT IT IS AND DOES

The United Hospital Fund of New York, formerly the Hospital Saturday and Sunday Association of New York City, was organized in 1879. This organization was the first recognition of the unified character of the city's hospital problem, and, to help solve it, the fund has enlisted the cooperation of people of every race and faith. The total sum received from the people of New York for support has been, from the beginning, $6,044,787.22.

In 1879, the fund contributed to nineteen hospitals, with a total for the year of 8,688 patients. Today, the fund comprises fifty-eight hospitals, with 195,281 patients. Its object and present activities are: to raise money with the least cost for hospital free work; to distribute it wisely and impartially among the hospitals; to promote high standards of administration and accounting; to collect and publish full and uniform statistics of the work and finances of hospitals; to secure free treatment for proper hospital cases; it has a committee on dispensary development; it maintains a Hospital Information Bureau.

All hospitals sharing in the fund are required to submit an annual statement showing in detail the work, income, and expenses of the hospital for the preceding year. These records are published and kept on file. Contributions are secured by volunteer committees of men and women from more than three thousand contributing firms; publications are distributed in letter and leaflet form; collections are taken in churches and synagogues on one Saturday and Sunday a year; contributions are made by many benevolent orders and societies. The distribution of these collections is made under the direction of a special committee without regard to race or creed, and the amount is based upon the number of days of free hospital treatment given by the institution during the year, combined with the daily cost of ward patients. The quality of hospital management is also taken into consideration.

At present, fifty-eight of the leading, nonmunicipal hospitals of the city belong to the United Hospital Fund, and each is entitled to one representative. The contributing public is represented by forty-eight members at large, elected by the trustees for a term of three years. These representatives, combined with the members at large, constitute the corporation, and elect from their number at each annual meeting a board of trustees, which is charged with the management of the organization.

Any hospital of Greater New York may, upon application, become a member of the fund after recommendation by the committee of admissions as to equipment and management, and subsequent election by the board of trustees, provided that it is duly incorporated; that it has had for three years not less than thirty-five ward beds; and that it has given during the same period not less than five thousand days of free service a year. Hospitals falling below standard forfeit their membership.

DEATHS OF CHILDREN FROM ACCIDENTS

During 1921, 3,483 persons died in New York City from injuries received in accidents. The heaviest mortality was between the ages of five and fourteen, in other words, at the ages when children use the streets most for play, and when they are least careful. The death rate during this period of life was thirty-one to the one hundred thousand. The only age at which the rate exceeded this, was over sixty-five years of age, where the rate was fifty-one to the one hundred thousand. The total number of deaths, however, of persons over sixty-five was less than one third of those between the ages of five and fourteen. It has been found that the largest number of street accidents occur between three o'clock in the afternoon, and six in the evening, when children are playing in the streets, and when people are going home from business or shopping.

During 1921, 864 persons died as a result of falls, 138 of these from fire escapes or windows. Almost one third of these latter deaths were those of children under five years of age. Burns and scalds were another important cause of deaths, and of these almost half of the deaths were those of children under five. Mortality from drowning increases steadily from the fourteenth to the twenty-fifth year. In 1921, fifty-three boys between the ages of five and fourteen were drowned in waters surrounding the city. The figures quoted show only a small amount of the suffering caused by accidents, for the statistics give only accidents resulting fatally. There are probably from ten to thirty times as many more accidents that do not result in death, but which cause long and painful suffering and often leave the victim permanently incapacitated. The indications are that most accidents result from carelessness, and that if children can be educated, as soon as they begin to walk, to exercise care, this terrible waste of life may in some measure be prevented.

News Items.

International Society of the History of Medicine Meeting.—At a meeting of the permanent committee of the International Society of the History of Medicine, held at Antwerp on April 11, 1923, it was voted to hold the fourth International Congress of the History of Medicine at Geneva, Switzerland, during the third week of July, 1925. The following officers were elected: President, Dr. Charles Greene Cumston, Geneva; secretary general, Dr. A. de Peyer, Geneva (Rue Général Dufour, 20); honorary president, Sir D'Arcy Power, London; honorary vice-presidents, Dr. Edward B. Krumbhaar, Philadelphia, and others.

Dr. Wolbarst Office Removal.—Dr. Abr. L. Wolbarst announces the removal of his office to 114 East Sixty-first Street, New York City.

Army Medical and Dental School Commencement.—The closing exercises of the Army Medical School and the Army Dental School session of 1923 will be held at the Auditorium, New National Museum, Washington, D. C., Friday afternoon, June 8th, at two o'clock.

Dr. Edward Canizares Commemorated.—The Department of Health of the City of New York has passed a series of resolutions commemorating the death of Dr. Edward Canizares, hospital physician at Riverside Hospital. Copies of the resolution have been included in the minutes of the Medical Board of Riverside Hospital.

New York Hospital Society Urological Department Reception.—Several hundred patrons of the Society of the New York Hospital were guests at a reception of the urological department of the institution, held in the governors' room on May 13th. Dr. Oswald S. Lowsley, the director, explained the important work this department was doing and told of plans for extending it.

International Congress to Meet in Rome.—On May 28th the permanent committee of the Congrés International de Médecine et de Pharmacie Militaires met in Rome, Italy, at the Military Hospital. Following this the second congress held its formal sessions. The congress was held under the patronage of the King and Queen of Italy, who, with Premier Mussolini, received all the delegates.

Dr. Schloss to Return to New York.—Dr. Oscar M. Schloss, formerly professor of pediatrics at Cornell University Medical College and during the past two years head of the department of pediatrics at Harvard University, will return to New York next fall and resume the chair of pediatrics at Cornell University Medical College and the directorship of the service at the New York Nursery and Child's Hospital.

Mt. Sinai Neurological Wards Endowed.—The new neurological wards of Mt. Sinai Hospital, forty beds, endowed by Messrs. Samuel and Harry Sachs, were opened on May 1st. In view of the serious shortage of beds for mental and neurological cases in New York hospitals, referred to in the report of the public health committee of the New York Academy of Medicine, the profession should welcome the endowment of these free beds.

American Psychopathological Association Annual Meeting.—The thirteenth annual meeting of the American Psychopathological Association was held in Boston, Saturday, June 2, 1923, at the Boston Medical Library, 8 Fenway. Contributors to the program were Dr. C. P. Oberndorf, Dr. Gregory Stragnell, Dr. Adolph Stern, Dr. A. A. Brill, Dr. Edith R. Spaulding, Dr. Thomas W. Salmon, Dr. Lightner Witmer, Dr. L. Pierce Clark, Dr. Morton Prince, Dr. Tom A. Williams, Dr. Harold I. Gosline, Dr. Isador Coriat, and Dr. Cornelius C. Wholey. A subscription luncheon was served at the Harvard Club at one o'clock.

Ninth National Chemical Exposition.—The Ninth National Exposition of Chemical Industries is to be held in the Grand Central Palace, New York, during the week of September 17, 1923.

Influenza in Alaska.—An epidemic of influenza exists among natives on the western Alaskan coast, officers of the United States Coast Guard cutter *Haida* reported upon arrival of the vessel here on May 12th in the course of her annual patrol of the Behring Sea.

Dr. Myers to Open Clinic.—Dr. Alonzo Myers announces the association with him in the practice of orthopedic surgery of Dr. J. Stuart Gaul, recently of Walter Reed General Hospital. They opened a clinic on May 15, 1923, at 8 West Seventh Street, Charlotte, N. C., to be known as the Alonzo Myers Orthopedic Clinic, Inc., with complete departments of physiotherapy, brace making and fitting and orthopedic equipment.

Gives Brain of Boy Genius.—The Department of Neurology of the University of Chicago received a unique gift. It is the brain of little Richard Maquiling Thompson, the four year old son of Dr. Thomas M. Thompson, professor of psychology at Colgate University, Hamilton, N. Y. The child, who was endowed with a remarkable mentality, was drowned in the lake on the Colgate campus. Richard's intelligent quotient as determined by the Stanford-Binet mental tests was between 160 and 165. The body was cremated and the ashes strewn over the university campus. The wonderful brain, however, was preserved, and was sent immediately to the University of Chicago.

Deaths in Week Drop 108 From Same Period in 1922.—There was a decrease equivalent to a saving of 108 lives in the deaths reported during the week of May 14th, as compared with the deaths of the same week last year, according to a report made to Health Commissioner Dr. Frank J. Monaghan by Dr. William H. Guilfoy, registrar of the health department. The total deaths reported were 1,423. The principal decline was shown in deaths from bronchial pneumonia. There were eighty deaths from this cause last week, while in the corresponding week last year there were 114. Of the contagious diseases the largest decrease was in diphtheria. There were twelve deaths from this cause last week compared with thirty-four a year ago.

Chicago Council of Medical Women Organized.—In order to collate valuable clinical experience and to promote fellowship, another medical society has been organized, the Chicago Council of Medical Women. Membership is restricted to women holding a license to practise medicine, and the council is limited to seventy-five active members. The incorporators are Anna E. Blount, Alice Conklin, Effa V. Davis, Mary E. Hanks and Lena K. Sadler. The management is represented by Anna E. Blount, president; Mary E. Hanks and Annie White Sage, vice-presidents; Lena K. Sadler, secretary; Eliza R. Morse, treasurer; Alice Conklin, Effa V. Davis and Helga Ruud, directors; Sarah M. Hobson, editor. Eighteen charter members are enrolled.

LONDON LETTER

(*From our own correspondent*)

London, *April 17, 1923*.

PERIL OF THE PEDESTRIAN.

Street accidents have greatly increased in this country within recent years. During 1922 there were seventy thousand accidents in the streets of Great Britain, seven thousand five hundred more than during the previous year. What are the causes of this increase? Is the greater proportion of them due to the carelessness of those who walk or to the indifference of those who drive? A large number of persons, of which the writer is one, believes that the push bicycle provides the most potent peril to the pedestrian. It comes on one silently and from nowhere. A motor cycle can be heard plainly, in fact every kind of vehicle motor driven or horse drawn can be heard, but not the silent push bicycle. It is governed by no rules of the road, comes hurrying along, often far too fast, sometimes on the wrong side of the islands of refuge, dodging in and out of the traffic and a continual source of danger to persons stepping off the curb. Every pedal bicycle should carry a bell which should be rung without cessation. Bicycles have increased in number enormously during the past few years. In 1915 there were under four thousand in this country, in 1919 there were nearly six thousand, in 1920 more than eight thousand, and in 1921 about eleven thousand. Speaking in a general way the cause of accidents is more often than not the fault of those on foot, and these accidents mostly happen either to the old, who are perhaps deaf and whose sight is defective, or to young children who do not realize the danger. However, there is no doubt that motor vehicles are often driven too fast, and in roads or streets in which there is a considerable amount of slow heavy traffic as well, the risks of accidents are intensified. When approaching a crossing there should be no overtaking of one vehicle by another. The perils of the streets are great and traffic should be organized in London and other big cities more systematically than it is at present.

MEDICAL POSTGRADUATE STUDY IN LONDON.

At a meeting of the Fellowship of Medicine held on April 13th last, at the house of the Royal Society of Medicine, a scheme was brought forward by the nonundergraduate hospitals in London which it was decided to accept and take immediate steps to put into operation. The scheme is devised to meet the needs of two distinct classes of postgraduate students, namely, those who require short general courses to refresh their knowledge and those who require advanced courses in the special departments of medicine and surgery. It is proposed to arrange the short refresher courses on the group system, centred in a general nonundergraduate hospital affiliated with certain special hospitals in its neighborhood, and that each group should be responsible for three or four such courses during the year. It is hoped that four or perhaps five of these groups will be founded in London. The program will be begun by a course at the Prince of Wales' General Hospital, Tottenham, assisted by the special hospitals belonging to the Northeastern Group, from June 11th to June 23d. Further details regarding this course and others to follow throughout the year will be published shortly. For graduates who require more advanced instruction it is proposed that each of the special hospitals should undertake two or three courses during the year and in these it is hoped that specialists from the undergraduate hospitals will be willing to come to the special hospitals on the invitation of the staff and assist in lectures and demonstrations.

THE INFANTS' HOSPITAL, LONDON.

The annual report of the Infants' Hospital, Vincent Square, Westminster, London, has just been issued. Six months or so ago Dr. Eric Pritchard was appointed director of this hospital and is thoroughly reorganizing its management. When he was given this post in June last, one half of the inpatient accommodation was closed down and the outpatient attendance had fallen to between two hundred and two hundred and fifty a month, compared with three hundred to three hundred and fifty in the previous year. Already the efforts of the new director and staff have been attended with much success, and it is hoped to make of the hospital a postgraduate medical centre for London where infants' diseases and nutrition can be studied clinically and from the laboratory viewpoint under most favorable conditions. The hospital is well built and arranged both as regards its inpatient and outpatient departments, and splendidly equipped. It contains public ward accommodation for twenty-five infants and isolation wards for eighteen, and excellent facilities for open air treatment. The outpatient department is spacious and contains a magnificent research laboratory. The object of the director is to make of it, in addition to an institution for the treatment and care of infants, a training school for students, postgraduate and undergraduate, and for nurses and those engaged in infant welfare work. It is intended for infants of the necessitous poor and Princess Mary has consented to become president.

COORDINATION NEEDED AMONG HOSPITALS.

There are more than one hundred hospitals in London, most of which are full and some of which have long waiting lists. At the present time there is frequently found to be a considerable amount of difficulty in gaining admittance for a patient, even if dangerously ill and requiring immediate hospital attention. It is said to happen with undesirable frequency that patients are carried from one hospital to another before room can be found for them. When they are finally admitted, it is obvious that a great deal of valuable time has been wasted and no doubt it happens that in this way lives are forfeited every day. It is suggested in a London evening journal by a hospital superintendent that it would facilitate matters greatly if an inquiry bureau were formed under the direction of the London County Council. It is pointed out that some of the advantages of this plan would be as follows: 1. It would coordinate the work of hospitals, and in urgent cases it could be stated promptly at which institutions there were vacant beds. 2. It would organize and control a complete ambulance service. 3. It would give specialized advice on health and hospital questions generally. There is a lack of coordination among the London hospitals and it is suggested that reforms in this direction come well within the province of the Ministry of Health.

THE ROCKEFELLER FOUNDATION AND THE SCHOOL OF HYGIENE.

The further steps necessary in regard to the formation of the School of Hygiene, for which the Rockefeller Foundation has promised to provide the necessary funds for construction, have been discussed between representatives of the Ministry of Health, the University of London and the Foundation. It has been decided to set up at once a Transitional Executive Committee to arrange for coordination with other authorities presently operating in the same or similar spheres; to evolve the organization of the School of Hygiene in detail; and to develop detailed plans of the School of Hygiene to such a point that construction can be actually begun by them. It is also proposed to appoint provisionally a director of the school who will act in an advisory capacity to the transitional executive committee, and the foundation has undertaken to provide a sum not exceeding four thousand pounds a year towards the salary and the expenses of the director. The Minister of Health has under consideration the question of the personnel of the transitional executive committee.

PLAGUE IN INDIA AND THE POISONING OF RATS.

A correspondent of the *London Times,* April 17th last, gives it as his opinion that the poisoning of rats is dangerous in the case of plague. A rat from a plague infested house is a source of danger when it dies, as the rat flea leaves the cold carcass and searches for another warm blooded host. The plague is conveyed by the rat flea which is not a source of danger until the rat is dead. Alive, the fleas prefer it to another host. In a successful campaign waged against plague in India rewards are only offered for live rats. The rat traps were cages and when full the rats were immersed in a weak solution of mercury bichloride. This disinfected the cages as well as drowning the rats. The cages were then shaken over small wooden boxes partly filled with jute waste. The dead rats fell into these boxes, and the fleas could be seen snuggling into the dry tow. The boxes were then thrown into furnaces and consumed.

A CRISIS IN INSURANCE PRACTICE.

The present agreement with regard to the per capita payment of panel practitioners, namely nine shillings and sixpence, about $2.40, ends soon when a crisis in the working of the National Insurance Act will be precipitated. A great deal of discontent on the part of the insured has been manifested for some time and, moreover, the approved societies are clamoring for a share in the administration of the act. They argue that if they pay the piper, they do this partly, they ought to call the time or, at least, have some voice in calling the time. It is believed that rather than give way to the approved societies or rather than let these societies have their own way, efforts will be made to induce the Government to repeal the act.

A TEXTBOOK OF PHARMACOLOGY AND THERAPEUTICS.

An English edition of a textbook of pharmacology and therapeutics, by Dr. E. Poulsson, professor of pharmacology in the University of Christiania, edited by W. E. Dixon, M. A., M. D., F. R. S., reader in pharmacology, Cambridge, has just been brought out by William Heinemann, Ltd., London. Those parts of this subject of the first importance are dealt with and the more recent valuable contributions. In the main the pharmacological system developed by Schmiedeberg is followed. There is room in the English language for a work planned in this way. It is excellent in all respects.

DEATH OF DR. ARTHUR LATHAM.

Dr. Latham died on April 13th last, in a nursing home in London. Dr. Latham was one of the best known physicians in London and one of the most loved and respected. He specialized in tuberculosis, of which disease his knowledge was profound and catholic. He was educated at both Oxford and Cambridge and was physician and lecturer on medicine at St. George's Hospital, London. In addition he held numerous appointments in smaller hospitals, and was senior assistant physician to the Brompton Hospital for Consumption. He won the first prize of five hundred pounds for an essay on the erection of King Edward VII Sanatorium. He was a frequent writer to the medical press and the author of several works.

NEW MINISTER OF HEALTH.

Mr. Neville Chamberlain, the new Minister of Health, by heredity and training should be well fitted for the position. He is a son of Joseph Chamberlain, formerly minister to Great Britain. Mr. Neville Chamberlain received his training in the same hard school as his father, in the municipality of Birmingham. However, the present minister has a rough road to travel. His position is quite the reverse of a bed of roses. The housing problem simply bristles with difficulties and that alone will occupy the greater part of his time. But the insurance scheme requires amendment, lunacy reform is called for, and Lord Athlone's report on postgraduate education should not be passed over. Mr. Chamberlain will have plenty of opportunity for the exercise of those great business qualities of which he has already shown himself to be possessed.

SMOKE ABATEMENT.

Our large cities continue smoky and dingy although better in these respects than formerly. In addition to being unesthetic, a smoky, dirt laden atmosphere is unfavorable to health. We are truly a conservative people. We even cling to our dirty atmosphere because we are used to it and perhaps, the necessary alterations to abolish it are not made, because the authorities do not wish to antagonize the big manufacturers by insisting that they take steps to do away with the nuisance. The question is asked, Why should other industrial countries be compelled to take such steps? If drastic repressive legislation in this direction can be enacted and carried out in these countries why not in Great Britain? The onus of discovering the means for suppressing factory smoke should not be thrown on the Government, as has been suggested here, but associations should be formed to maintain scientific experts who would advise and assist its members in the economic use of fuel. The Smoke Abatement Committee suggested that the Ministry of Health appoint one or more scientific fuel experts who would consider cases in which exemptions were applied for, and to bring pressure upon a defaulting local authority. If a clean or fairly clean atmosphere can be obtained in Pittsburgh, it should be possible of attainment in London.

VIENNA LETTER

(*From our own correspondent*)

VIENNA, *March* 30, 1923

(*Continued from page* 633).

These people have entirely lost their sense of duty. I once sat at dinner with close friends of my boyhood days. The question arose as to whether or not a man named A. should pay some debt he owed to B. I remarked, "Why, certainly he should, provided he has the money to pay it with." "Oh, no, excuse me, dear doctor," interjected a man I have all my life considered honest.

"A. should pay only if B. is in need of the money." All my arguments to the effect that it was A's *moral* duty to pay an honest debt, provided he had the money, failed to convince my friend of the utter baseness of his conception. I grew so vexed, indeed, that I left the dinner party. On my way home, I asked my own brother in law, a prominent physician, in utter despair, if he thought me in the wrong. He replied, "You see, the people here now do to each other, individually, what the government has done to them collectively. The government borrowed money from them in the form of war loans and refused to pay it back." Then it was that I understood. The war, with its hideous lies, has annihilated the people's sense of right and wrong.

And how should medical men, even the leaders in the profession, remain free from that contamination? There is no sense of duty at the clinics either. The assistants—many of them teaching professors, of international reputation before the war—have lost their idealism, their devotion to research work. They look hungry, starved, and ill clad; their clothes have been turned inside out because they can't afford to buy new ones, their shoes are worn out, their shirts torn. One of them told me that he hardly averaged more than one consultation a day. He cannot feed and clothe his wife and three children on such an income.

In this connection, I wish to repeat a dialogue I had with one of the clinical chiefs. He said, "Doctor, you are the chairman of the American Medical Association of Vienna. Truly, I don't like to see the young American doctors come over here and take up all the time of our assistants by asking for courses. Our assistants then have no time left for research work. We rather want men to come over here to do research work." "Well, chief," I replied, "don't you think an assistant is better off if he earns sixty dollars a month—a sum sufficient to cover the total living expenses of himself and family—by teaching one hour a day, and still has twenty-three hours out of the twenty-four left for doing research work, than if he sat all day nervously at the clinic and listened to the telephone, to snatch a few consultations which cannot, at best, bring him in enough money to keep him merely alive?" "Well," answered the professor, "perhaps you are right. I never thought of it that way." This same chief never makes the rounds of his wards. At least I never saw him make any during half a year's stay at his clinic. Clinical chiefs, in prewar times, did not shirk their duty in this way. Nothnagel always found time to make the rounds with his assistants and pupils every day, thus giving them valuable information and inspiration. The assistants of the above mentioned chief informed me that he made the clinical rounds only once a year—at Christmas, when all the patients get their little Christmas gifts.

The clinics are very poorly equipped; there is no soap nor any clean towels in the ward rooms if you wish to wash your hands after handling the patients. Owing to the lack of proper food supplies, the once famous dietary kitchen has been entirely abolished. Professor Salomon, the genius "cook" and former assistant to Professor von Noorden, has left Vienna for South America. (His chief, von Noorden, had resigned from the chair of internal medicine even before the war because, as I understand, he was disgusted at the nagging attitude of the government, as well as his fellow professors.) The one thing which I intended to take up, in Vienna, was dietary cooking; for the reason mentioned, there was no possibility of carrying out my plan. In this connection it may be interesting to note that I searched for months, in all the internal clinics, for a dietary nurse who could supervise the kitchen of one of my rich friends, a diabetic. Such a nurse did not exist over here! Compare with this your wonderful diet nurses, educated at the clinics of Allen, Jocelyn, at the Rockefeller Institute and many others!

Still, the leading professors don't believe they can learn anything on medical lines from their American colleagues, and they as well as the intellectual public of Vienna—whenever their attention is called to the necessity of learning the more advanced ways of Western nations—are ready with the stereotyped reply, "If we really are not superior in everything medical, why do you Americans come over here to learn from us?" The rejoinder, that every successful American owes his success to his being ever ready to learn from others and to adopt the things he finds better among his neighbors, whoever they may be, does not convince those who do not wish to be convinced—and that is the majority among them. Psychologically, this atitude is easily understood. The only thing left to them, the *one* thing the horrible war could not take away from them, is their old culture, as they term it; or their antiquated culture, as I should like to call it, and they cling to it with the superhuman tenacity of a drowning man clinging to a piece of driftwood, to the débris of the wreck of a formerly gorgeous ship.

The equipment of the clinics was, as I said before, very inadequate. Sheets, bedding, instruments, alcohol and chemical reagents were, to a large extent, supplied to the hospitals by the American Red Cross—the government not having any money for the purpose. While I worked at the clinic, I bought my own chemicals and paid large tips to the *Diener* to have my chemist get decent service.

A lawsuit recently brought against one of the nurses of the dermatological clinic of Professor Riehl throws some light on the state of affairs (July 18, 1922). The nurse was accused of having handed to the surgeon operating on an eight year old boy, for lupus, a bottle containing mercury bicyanate instead of cocaine for hypodermic use. The physician in charge of the clinic, Professor Arzt, declared in the witness box that owing to the terrible want and poverty at the hospitals, the various preparations were not kept in the proper bottles, and that was the reason why the nurse mistook one bottle for the other.

The cases coming to the hospital are not of the variety we used to see before the war. This may easily be understood if we consider the fact that the hospitals formerly used to draw their patients from a population of fifty millions, inhabitants of the old Austro-Hungarian Empire, whereas now there are only six millions of inhabitants contributing to the sick material of the Viennese hospitals. The detached States, Czechoslovakia, Hungary, Jugoslavia and Poland have established their own clinics, and they do everything possible to make the journey to Vienna a great nuisance. They have established or enlarged universities of their own, and try to convince their inhabitants—they have fairly succeeded in doing so—that their own clinics and hospitals are just as good, if not better.

The wonderful, large Viennese institutions for chemistry, biology, physiology and neurology are to a great extent deserted, or kept partially going with the help of foreign donations (Rockefeller Institute, etc.). The government sees itself compelled to reduce the number of peripheral hospitals, as well as some of the departments of the main hospitals, owing to lack of funds and the decreasing number of patients. The great Anatomical Institute, once the pride of Vienna when Hyrtl, Zuckerkandl and Toldt were its chiefs, is well on the way to meet the same fate. The regular State subsidy amounts to six hundred thousand kronen, the State contribution to the burial of corpses five hundred thousand—altogether about one million kronen a year, that is, fifteen dollars (!!) The rest of the expenses must be met by charitable contributions (Rockefeller Institute, Switzerland, etc.). The subsidy for its library consists of two hundred thousand kronen—three dollars (!!) Think of the number of foreign magazines that can be subscribed to with such a sum!

The yearly contribution to the renowned Anatomical Museum consists of three thousand kronen—just enough to buy half a loaf of bread. The linen, instruments, mikrotom, apparatus, etc., have been contributed—here, again, by foreign countries. The worst drawback is the fact that there are not enough corpses. The institution receives only fifty corpses a year from the hospitals, and these are just sufficient to supply the needs of the native students. There are altogether about seven hundred of the latter, while there are over seven hundred students of other nationalities trying to get to the twenty-four dissecting tables of the institution (Jugoslavs, Bulgarians, Roumanians, Greeks, Turks, Russians, Egypians, Chinese, Japanese and—Americans)! If it were not for the fact that Hochstetter and the genial Tandler manage to keep corpses for a year under carbolic acid, in the big troughs in the basement, it would be utterly impossible to accommodate that number of students. If one stops to think, however, that it takes ten tons of carbolic acid a year, that is twenty-five million kronen worth of carbolic acid to do this alone, the ever loud cry for corpses for anatomical studies may be easily understood.

The American colleagues who came over here for postgraduate work in surgery were more or less disappointed; they could not learn much about technic by watching the operator from their benches. A few of them succeeded in getting the position of first assistant to one of the professors of surgery at some of the peripheral hospitals either by paying a good fee to the professor or "making a liberal contribution to the hospital fund," as they termed it. The law forbids any foreigner to operate on the living, though a few Americans did succeed in performing some nose, ear, or throat operations on the living by secretly paying a fee to the surgeon in charge. On the whole, the men attending the courses in eye, ear, nose, and throat were satisfied with the clinical part of their work, but thought that the operative technic was superior in the United States.

The visiting physicians were more satisfied with the work they got in heart diseases. Professor Wenckebach's assistant, Professor Winterberg, is in charge of the department for heart diseases and makes electrocardiagram his hobby. Professor Kaufman, in charge of a heart station comprising thirty beds (which originated during the war and is still kept open by means of charitable contributions) is an excellent teacher of the old Nothnagel school, and he gives first rate courses for general practitioners. Professor Finsterer, an artist in abdominal local anesthesia, is admired for his stomach resections. Professor Wagner's clinic for nervous and mental diseases has large material. His new treatment of paresis (by means of intravenous injections of malaria tertiana blood) is most efficient. Syphilis of the central nervous system may, however, be better studied at the Nonne Clinic at Hamburg or at the Vanderbilt Clinic in New York than over here. Urology (cystoscopy, etc.) is well represented by Professor Blum, Dozent Pleschner, Dr. Bachrach and the former assistants of the late Professor Zuckerkandl. Dermatology, as taught by Professor Ehrman—one of the few really scientific workers—is quite in favor with the American doctors, as is also Dozent Stein and Oppenheim. Professor Ehrman's department will, unfortunately, soon cease to exist, sharing the fate of a few other departments which the government, compelled to reduce expenses, has decided to abolish. Many of the laboratories stand empty owing to lack of chemicals, fuel and light.

The sharp reduction in all expenditures has worked havoc with most of the scientific institutions in Vienna. A few weeks ago, for instance, two large laboratories in the stately Chemical Institute had to be closed, and about seventy students were compelled to be idle, because one of the laboratory servants was taken sick and there was no one to fill his place. The students dug into their own pockets to raise money—about two million kronen a month—to pay the wages of another servant who had been discharged by the State. Assistants and students waste a great deal of their time in doing the menial work of their laboratories. There are no servants to be had for purely scientific research work.

Ehrman, chief of the department for dermatology, Frisch, chief of the department for internal diseases, and Foederl, chief of the surgical department, were notified last December that they were to be "reduced." Men in their best years, of international scientific reputation, who have been the teachers of generations of physicians all over the world, fall victims to this indiscriminate reduction policy.

(*To be concluded.*)

Book Reviews

THE PIRQUET METHOD OF FEEDING

Auf Grundlage des Pirquetschen Ernährungssystems. Die Ernährung Gesunder und Kranker Kinder. Von Privatdozent Dr. Edmund Nobel. Wien, Leipzig, München: Rikola Verlag, 1923, pp. 74.

Heretofore the physician was compelled to seek the data for feeding a healthy or sick child at various sources. In this monograph the author, after many years of experience as a teacher and physician, has endeavored to present the new theory of nutrition in as simple a manner as possible. The Pirquet system of feeding has become quite popular abroad. With a suitable dietotherapy many cases of disease may be successfully treated and frequently an expensive drug therapy may be eliminated. This system of feeding is based on the physiological nutritional unit of milk instead of the purely physical calory: one gram of standard milk is the metric nutritional unit and is called a nem and from this the nutritional value of the various foods are calculated, both raw and when cooked or prepared. The required amount of food in a given case depends upon the linear distance between the scalp and the buttocks, with the patient in the upright sitting position: the cube of the sitting height equals ten times the body weight in grams, from which the nutrition surface is calculated. In this way the amount of food required at each meal, for one or more patients, may be estimated. After discussing the theory of this system of feeding, the feeding in the following conditions is discussed: pregnancy and lactation; the healthy and sick child; artificial feeding; heat prostration; prematurity, malnutrition and vomiting; enuresis nocturna, Barlow's disease and xerosis and keratomalacia. Directions for the preparation of vitamine containing fruits and vegetables are given.

A TEXTBOOK ON RECTAL DISEASE

Diseases of the Rectum, Anus and Colon. Including the Ileocolic Angle, Appendix, Colon, Sigmoid Flexure, Rectum, Anus, Buttocks and Sacrococcygeal Region. By Samuel Goodwin Gant, M.D., LL.D., Professor and Chief of the Department for Diseases of the Colon, Rectum and Anus at the Broad Street Hospital Graduate School of Medicine, etc. With 1128 Illustrations on 1085 Figures and 10 insets in Colors. Volumes i, ii and iii. Philadelphia and London: W. B. Saunders Company, 1923. Pp. ix-543, 545 and 528.

The author has produced a comprehensive textbook, which is characterized by clearness and attention to detail and which is the last word in this branch of medicine. It is of value to the specialist and the general practitioner, taking up every aspect of the diseases of the lower intestinal tract and devotes more attention to diseases of the gastrointestinal tract than any other treatise published heretofore. Office treatment, both medical and surgical, is stressed. The illustrations are of large size, very apt and abundant; the colored plates are beautiful. The reading is easy owing to the large and clear type and the arrangement of the material is such as to render it of great value as a work of reference. This is the latest and best book on the subject.

The first volume deals with the rectum and anus, including the embryology of the gastrointestinal tract, the anatomy of the rectum and anus, the diagnostic significance of anorectal symptoms, the examination and diagnosis of the gastrointestinal tract and buttocks, and the relation between anorectal and other diseases. The various methods and kinds of anesthesia and their technic, including general, spinal, paravertebral, sacral, extradural, caudal, regional and local infiltration with the various anesthetics are discussed. The malformations and anomalies of this part of the anatomy are described. Wounds and injuries, inflammations and fissure in ano are discussed, with special attention to the common conditions of anorectal fistula and hemorrhoids. The relation between pulmonary and anorectal tuberculosis to fistula in ano is explained.

The second volume takes up the subjects of hemorrhage, procidentia, ulceration, pruritus, perianal skin affections, tuberculosis, esthiomène, venereal diseases, abnormal sexual practices, stricture, cysts, diverticula and tumors; also the anatomy and physiology of the colon and ileocolic angle and the various forms of colitis.

The third volume includes infections and diverticulitis of the colon and ileocolic angle, focal infections, tumors, hemorrhage, constipation and obstipation. The chapter on constipation gives the medical treatment in detail, including also the various methods of physiotherapy; that on obstipation contains detailed descriptions of the various operative procedures used. The various operations on the lower intestinal tract, with their advantages and disadvantages, are discussed in full. A special chapter is devoted to the colonic, sigmoidal, rectal and anal diseases encountered in infancy and childhood.

SKIN DISEASES AND METABOLISM

Stoffwechsel und Haut. Grundzüge zu einer dynamisch-energetischen Stoffwechselpathologie und therapie der Hautkrankheiten. Ein Beitrag zur Pathochemie des Blutes. Von Dr. Erwin Pulay. Berlin, Wien: Urban and Schwarzenberg, 1923, pp. xvi-240.

There are many theories regarding the relationship between disturbances of the internal organs and those of the skin. The author endeavors to build a solid foundation for dermatology with the aid of chemistry of the blood and tissues; the field of therapy will, no doubt, be enriched with the supplemental application of pathology, clinical chemistry and study of clinical phenomena. The former methods of studying skin diseases microscopically, bacteriologically, pathologically and morphologically have imparted a certain onesidedness to dermatology, with the result that great advances were made but at the sacrifice of the relationship of skin diseases to the body as a whole; dermatology lacked the dynamic point of view. Skin diseases may be divided into two groups: the dermatoses caused by specific excitants in the skin (infectious diseases) and those resulting from possibly unknown processes of a functional nature in other organs—toxicodermias or dermal anaphylactic phenomena. In order to determine the relationship between disturbances of the internal organs and the skin changes, the author utilized the pathological chemistry of the blood.

It has been shown that every retention of substances in the blood runs parallel with such a retention in the tissues. This leads to the therapeutic endeavor to treat skin diseases with the biological remedies, such as proteotherapy, calcium therapy, and colloid therapy. To do this intelligently the deviation from the normal chemistry of the blood must be understood. Constitutional factors must also be taken into consideration, as the appearance of an organism depends upon two factors: the structure of the germ plasm and the external factors active during development. This may be done in two ways: clinically, by classifying the different dermatoses according to constitutional types, thereby establishing a relationship between the skin changes and other organs, or by accurately determining the individual constitutional types and differentiating them more sharply. The chemical and physicochemical theories of cell function and the dependence of this function upon changes in the condition of the cell have also had their effect on dermatology—in fact, a great advance has been made by determining the close relationship between the blood and the skin in metabolism.

The author then discusses the following blood elements and metabolic conditions: the coagulation of blood plasma, the serum, acidosis, ionization, hemoglobin, osmotic concentration and electrolytic balance, specific gravity, dry substance and water content, the pathology of water metabolism, tumescence and detumescence, the metabolism of nitrogen and albumin, sugar, carbohydrate metabolism, lipemia, cholesterin, uric acid and purin metabolism, chlorides and sodium, calcium metabolism, the action of electrolytes and the nervous system, internal secretion and blood chemistry, blood chemistry and consitution, light and its effect on living matter and colloid therapy.

Clinically, the author shows that the morphological changes in the skin may be explained physicochemically as phenomena of tumescence and detumescence and he explains the clinical phenomena of various skin diseases in the light of metabolic changes. The methods of examining the blood and the estimation of its constituents are detailed. The blood changes encountered in various skin diseases are tabulated for easy reference.

The dermatologist who reads German will not want to be without this book, which lays the foundation for a new and more expansive outlook in dermatology.

DISEASES OF CHILDREN

Diagnostik und Therapie der Kinderkrankheiten. Mit speziellen Arzneiverordnungen für das Kindesalter. Ein Taschenbuch für den praktischen Arzt. Von Prof. Dr. F. Lust, Direktor des Kinderkrankenhauses in Karlsruhe. Dritte, neubearbeitete Auflage. Berlin und Wien: Urban & Schwarzenberg, 1923. Pp. vii-465.

This is an intensely practical book, devoid of all theory, on the diseases of children, dealing with the essential points in diagnosis, especially of the specifically infantile and rarer disease pictures and the therapeutics of infancy and childhood. It serves well its purpose of a pocket edition for the use of the general practitioner. The book is divided into two parts.

The first part takes up the normal development and measurements of the child, nutrition, diseases of the newborn, constitutional and metabolic diseases and those of the various systems and organs of the body. The diseases of the digestive tract are divided into those of the mouth, pharynx and esophagus, the stomach, disturbances of nutrition with natural and artificial feeding, various intestinal diseases, and those of the liver and the peritoneum. The diseases of the urogenital and nervous systems are also considered extensively. Special chapters are devoted to the infectious and skin diseases. The chapter on therapeutic technic, including physiotherapy, serotherapy and organotherapy, is particularly helpful. The second part gives a list of all the drugs, food, mixtures, remedies, etc., with directions for their preparation and dose. The list is long and intentionally contains many drugs that are not generally used in pediatrics.

TREATMENT OF TUBERCULOSIS

Handbuch der Gesamten Tuberkulose Therapie. By Dr. Ernst Loewenstein. Berlin and Wien: Urban and Schwarzenberg, 1923.

Although entitled a handbook of therapy of tuberculosis, this work is in reality a comprehensive textbook of tuberculosis in all its forms with special emphasis on treatment and prophylaxis. This is as it should be, for rational treatment demands a thorough understanding of the nature of disease and of its pathological anatomy and physiology.

The book is planned with the belief that the hospital and sanatorium treatment of tuberculosis can at best be but a short episode in the course of the individual case, and that the brunt of the management of tuberculosis falls on the general practitioner. There is first a careful presentation of the factors concerned in the healing of a tuberculous lesion, then a short but comprehensive description of the pathology and symptomatology of the disease and, finally, a discussion of treatment in all its forms with great attention given to technical details.

Only the first volume in two parts has appeared at the present writing. This volume includes a statistical study of the incidence of tuberculosis, an excellent chapter on tuberculosis of the bloodvessels, one on the anatomical and clinical forms of pulmonary tuberculosis by Bacmeister. Other sections discuss the principles of light therapy and climatic treatment, the construction of tuberculosis sanatoria, institutional treatment, and a statistical study of the results of sanatorium treatment. There is a presentation by Dr. J. Walsh, of Philadelphia, of the tuberculosis clinics and tuberculosis prevention program of the United States. Five hundred pages are devoted to a discussion of the physiological principles of nutrition with special reference to nutrition in tuberculosis. This includes a review of the physiology of digestion and a detailed discussion of the individual foodstuffs, their preparation and food value. The author, Durig, covers every conceivable aspect of the subject from a discussion of the best cuts of meat and the technic of cooking, to a consideration of the specific dynamic action of protein. In the second volume specific methods of therapy, as well as the treatment of extrapulmonary tuberculosis, will be presented.

The work may possibly be criticized for its wealth of detail. Its value lies in the mode of presentation. For instance, the chapter on light is accompanied by a review of the physics and chemistry of light rays, their biological effects and the physiology of their action. It gives the physician a thorough understanding of the methods which he employs and substitutes rational physiological concepts for blind empiricism, bringing as far as possible the same critical spirit to problems of therapy as to diagnosis and laboratory procedures.

ROCKEFELLER INSTITUTE REPORT

Studies from the Rockefeller Institute for Medical Research. Reprints Volume xliv. New York: The Rockefeller Institute for Medical Research, 1923, pp. 6-610.

This publication is a report of the various activities in the laboratories of the Rockefeller Institute, mostly of a purely scientific nature. In the department of pathology and bacteriology, this number contains a number of articles on experimental epidemiology, which are the initial series of reports on the relation between epidemics among laboratory animals and respiratory borne infections, the disease investigated being mouse typhoid. Other articles deal with the organotropic, bacteriotropic and leucocytotropic actions of certain organic chemicals, the rabbit septicemia bacillus and the etiology of yellow fever. In biophysics, there is an article on mouse typhoid and its control by vaccination. The articles from the departments of chemistry, experimental surgery and general physiology are not of a practical nature. The articles on the hospital work include such practical subjects as the influence of the thyroid upon diabetes by F. M. Allen, the carbohydrate requirement in children by L. E. Holt and H. L. Fales, the treatment of rheumatic fever by H. F. Swift and several others of a less practical nature. There are also a number of articles from the department of animal pathology. They are nearly all reprints from various scientific journals.

LUMBAR PUNCTURE

Die Lumbalpunktion. Anatomie, Physiologie, Technik, Untersuchungsmethoden, Diagnostische und Therapeutische Verwertung. Von Dr. Martin Pappenheim. Wien, Leipzig, München: Rikola Verlag, 1922, p. 184.

This monograph is the result of many years of experience, not only in the practice of lumbar puncture, but also in teaching it to others. It was prompted by the many coarse technical errors resulting from the lack of a complete understanding of the essential points in the various spinal fluid reactions and the consequent varying reports on these reactions in the literature. Certain details in technic are especially emphasized, thus imparting a personal note to the work. Only the most important spinal fluid tests are described, including some which the practising physician cannot carry out himself, such as the Wassermann and hemolysin reactions. Nevertheless the physician should be acquainted with them well enough to be able to evaluate the result, provided he knows the methods used by the laboratory doing the work. Certain simplifying modifications are introduced. After discussing the anatomy, physiology and the source of origin of the spinal fluid and the theoretical significance of the individual methods of examination, much of which is still a moot question, the following tests are described and discussed: the various methods of measuring the pressure and the sources of error, the physiology, properties, chemical construction, pathology, the quantitative and qualitative examinations and differentiation of cells, the various reactions (globulin, Nonne-Apelt, Ross-Jones, Pandy, Nissl and Brandberg-Pfaundler), the various tests for albumin, the coagulation of fibrin, the colloid reactions, the Wassermann, flocculation and hemolysin reactions and the diagnostic and prognostic and therapeutic significance of lumbar puncture.

RECORD FORMS FOR SOCIAL WORKERS

A Form of Record for Hospital Social Work. Including suggestions on organization. By Gertrude L. Farmer, Director, Department of Social Work of the Boston City Hospital. Price $1.50. Philadelphia, London and Montreal: J. B. Lippincott Company, 1921.

The six chapters of this little manual of eighty-one pages are devoted to various record forms, the short service record, the five by eight record, the extension folder, further uses of the extension record system and illustrative records. While primarily intended for hospital extension work and for the benefit of the discharged patient the matter is naturally of interest to all social workers.

BEGINNER'S BOOK IN PSYCHOANALYSIS

Your Hidden Powers. By James Oppenheim. New York: Alfred A. Knopf, 1923.

Mr. Oppenheim complains of the lack of an adequate Beginner's Book in Psychoanalysis. He proposes to furnish one. And so he does. But one feels, after reading it, that the beginners are just about as far as they were before. He acquaints them with certain new words; he outlines the subject rather warily; he answers a number of the more usual lay questions. Then he moralizes. The book is really a collection of essays on lofty ideals and fine feelings. From time to time his poetry carries him away and he produces a really delicate piece of writing that delights the reader for apt expression of general ideas. He does emphasize the needs of the individual—self knowledge, and work. But he does not show clearly or unmistakably how these ends are to be attained. So the Beginner's Psychoanalysis still remains to be written. The columnar essayists have added another stick or so to their easily read, easily digested, world direction of thought!

A PSYCHOPATHIC STUDY OF EDGAR ALLEN POE

Edgar A. Poe. A Psychopathic Study. By John W. Robertson, M.D. New York and London: G. P. Putnam's Sons, 1923. Pp. 331.

The interest which the reading of this book arouses in the subject of the work, this man of brilliancy and of sorrows, one might consider as a tribute only to the memory of Poe. But it denotes that the author has accomplished the purpose of his work, evidently a labor of love. The book is one written under a deep appreciation of the character and work of Poe by one who is familiar with his material and has the background of the mental scientist able to weigh facts. He has cleared the field of longstanding calumnies against the character of Poe which the world had carelessly accepted without the effort of such scientific investigation. Robertson lays emphasis through his careful psychiatric examination of it upon the actual pathological basis of Poe's erratic life. He distinguishes between the illness which so often incapacitated him from work and the actual force of his genius, instead of blindly ascribing his brilliant productions to the disturbances of his power which arose. Though genius and mental disturbance may exist side by side the latter is not dependent on the former as is popularly supposed. The book, readable as it is, would gain in clearness by some condensation especially in the first part. There is often repetition. Furthermore, we would disagree with Robertson that psychology, especially its newer form, could not add still more understanding to the life and character of this remarkable man. The author's discussion of the significance of the brain tissue behind personalities has at times an ominously materialistic sound but his own practical psychological viewpoint fortunately outruns this narrower one.

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Medicoliterary Notes.

The forty-fifth annual report of the Department of Health of the State of New Jersey for 1922 has just been issued. The two functions especially emphasized are those of food, beverage, and water supply sanitation, and the compilation of complete and accurate vital statistics.

* * *

The Ethiopian Art Theater, a company of Negro actors, are presenting under the direction of Raymond O'Neil two interesting plays—*The Chip Woman's Fortune,* which might almost be called a folk drama, and which is excellently done, and Oscar Wilde's *Salome,* not so successful, partly because the play itself is essentially a drama for reading and not for acting.

* * *

The Philadelphia General Hospital has recently issued the tenth volume of its Reports, succeeding the volume issued in 1913. It is a valuable contribution to medical literature, consisting as it does of clinical papers most of which have not heretofore been published.

* * *

The Distinguished Service Medal has recently been awarded to Miss Adèle Poston, of this city, formerly superintendent of nurses at Bloomingdale Hospital. Miss Poston organized the first unit of psychiatric nurses sent abroad for treatment of mental and nervous conditions in the A. E. F., and acted as chief nurse of Base Hospital 117, the first American hospital for war neuroses.

* * *

Summer courses in psychiatric social work will be given in two graduate schools for social work—Smith College, and the New York School for Social Work. The eight weeks session of the Smith College school will open on June 5th, and the course at the New York school will begin on June 14th and continue until July 25th.

* * *

The Cancer Commission of Harvard University has recently issued the tenth annual report of the Collis P. Huntington Memorial Hospital and the Laboratories of the Commission, for the year ending June 30, 1922. The report states that the most notable event of the year's work was the completion of the new laboratory building and its designation by the president and fellows of Harvard College as the John Collins Warren Laboratory, "in grateful recognition of his valuable services to the University."

* * *

Public Health Reports for January 19th contains the address made by W. Mansfield Clark to the staff of the Hygienic Laboratory at the celebration of Pasteur's centenary. It is one of the best summaries of the work of the great French scientist that the many centenary celebrations brought forth.

* * *

One of the notable scientific contributions of the current year is the *Physiology of the Ascent of Sap,* by Sir Jagadis Chunder Bose, Director of Bose Research Institute, Calcutta, India. The book is published by Longmans, Green and Company. Doctor Bose's researches into this hitherto obscure and elusive problem in plant physiology have proved, he states, the existence of active pulsating cells in and throughout the plant from root to leaf whose pumping action gives rise to the conduction of the sap.

* * *

The *International Library of Psychology, Philosophy and Scientific Method,* published by Harcourt, Brace and Company, is soon to be enlarged by several new volumes. The late Dr. W. H. R. Rivers is the author of two volumes, *Psychology and Politics,* and *Conflict and Dream;* Prof. C. D. Broad's Scientific Thought reviews the progress in recent years of the concepts of time, space, motion, and matter; *The Meaning of Meanings,* by C. K. Ogden and I. A. Richards treats of the influence of symbolism and language upon present day thought; and—perhaps the most notable contribution for the physician—a translation of Dr. C. G. Jung's *Psychological Types,* with an introduction by Doctor Baynes.

* * *

Dr. Emile Weisweiller, chief of the Division of Venereal Diseases of the League of Red Cross Societies, has an interesting article in the *World's Health* for February on the foundation in Paris on January 27th of the *Union Internationale contre le Péril Vénérien.* The meeting was attended by representatives of British, French, Spanish, Swiss, and Belgian societies, by delegates of the League of Red Cross Societies, and unofficially by Japanese delegates. National societies of many other countries signified their allegiance in the union.

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Sweden will be the first country in Europe to inaugurate a system of medical advice by radio from leading hospitals in the cities to Swedish ships at sea. Such a service is already in operation in this country.

* * *

C. A. Hoeffteke, of 7 Henley street, London, is about to bring out a book describing the extension method for treating various deformities and disabilities produced by disease and accident. The work should be a valuable source of information for medical men who are unacquainted with the remarkable results obtained by this method. The book will be published shortly by the medical department of William Heinemann, publishers, London.

Practical Therapeutics

NEW METHOD OF TOPICAL TREATMENT FOR GASTRODUODENAL DISEASES

By L. Winfield Kohn, M. D.,

New York.

With the hope of obtaining better results a few months ago I attempted to approach the treatment of gastroduodenal ulcer in a somewhat different manner from that ordinarily practised. Most of all was I convinced that ulcer of the stomach and duodenum, more especially the latter, was a common condition, despite the fact that the x ray was not always capable of exhibiting a definitely persistent pathognomonic defect or deformation. I also realized the unsuccessful results following the ordinary methods of medical treatment and the discouragement following surgery. To improve upon either of these methods was my aim. As a result, a combination of both was decided upon in the form of a mechanical and medical treatment. The results following this medicomechanical treatment have been most gratifying.

The treatment incorporates topical, medical and dietary considerations. Topical treatment, or the direct application of medical effort to gastroduodenal ulcer, can readily be appreciated. To render the ulcer accessible to direct treatment is one of the features of the method. Through the medium of the small fractional tube, this aim is readily realized. Forms of topical treatment of gastric ulcer have been resorted to in the past but not often nor in the manner advocated by this method.

Topical treatment of the past has lost vogue because success with it was not readily attained, because it was a too time consuming method, often distasteful to the patient, not persisted in by the physician, and because the larger tubes and improper medication only were mediums of choice. Today, however, with the small fractional tube at hand and valuable medicaments obtainable, we may aim at a more successful topical treatment. This must, however, be supported by proper medical and dietary indulgence.

When we consider the failures following pyloroplasty and gastrojejunostomy, the dangers associated with such destructive operations as pylorectomy, partial gastrectomy, resection, ulcer excision, etc., we readily appreciate the indications for medical treatment; yet, we must admit that there are times when operative measures cannot be dispensed with. One principle, however, that every medical man should subscribe to, is that of trying to reduce operative interference upon the gastrointestinal tract to a minimum. To my mind surgery should be resorted to only in acute conditions or in those instances where definite mechanical and troublesome complications have arisen.

If we hope to continue prescribing medical treatment for these many conditions, our effort will necessarily have to prove successful lest it may also be abandoned. The treatment in the past, which depended upon the principle of alkalinization through the taking of medicine alone per os and through regulated diet, has not always been sufficiently successful. To impose bed rest often proves exceedingly beneficial to the patient but a hardship because of economic conditions, and for that reason is not considered as frequently as it should be. Thus far, these different objections seem to have been satisfactorily overcome by the treatment to be described below. I, personally, regard it as the most satisfactory ambulatory method of treatment for gastroduodenal ulcer and other gastric conditions. Experience in the treatment of a large number of patients suffering from gastric ulcer, duodenal ulcer, gastritis, etc., has convinced me that a step in a progressive direction has been made. Amazing and most pleasing has been the relief experienced by many ambulatory patients through freedom from their subjective symptoms. In bed patients upon whom this treatment could be indulged more frequently and for more prolonged periods with better control, the result of treatment by this method should prove even more gratifying.

Before we dare hope to treat successfully ulcer or, for that matter, any organic disease of the stomach or duodenum, we must come to some definite conclusion as to the true nature of the existing condition. Then may we aim to approach the problem logically. Are we really dealing with ulcer? In just what portion of the stomach or duodenum is the ulcer located? Is the ulcer mucosal or deep? Has perforation ever occurred, and is the ulcer associated with troublesome adhesion formation? Has bleeding been prominently associated? Have we troublesome functional disturbances to contend with? Are there secondary intragastric developments of an organic nature, such as atony, muscle hypertrophy, scar tissue, and new growth? Is the ulcer acute or chronic, and are the adjacent tissues infiltrated? Often in duodenal ulcer the biliary tract gives evidence of being diseased, and unless this is taken into consideration the result of our treatment will be failure. The general constitutional condition of the patient must also be given our earnest concern, if we hope to be rewarded by definite improvement. It is no simple task to answer satisfactorily the aforementioned questions, but if we approach the problem in the manner implied by these queries, we are sure to better appreciate the necessities demanded.

After satisfying myself that the patient is suffering from ulcer, and after I have acquainted myself as thoroughly as possible with the associated local and general conditions that must not be overlooked, treatment is instituted. Practically every patient to whom I have given the treatment outlined below was ambulatory and all exhibited remarkable improvement both subjectively and objectively. Under objective improvement I would refer to disappearance of tenderness upon pressure rather than fluoroscopic improvement, though I have seen improvement fluoroscopically in relation to distributed peristalsis, motility and tone.

The plan of treatment instituted, whether the case was one of gastric or duodenal ulcer, was as follows: During the first week or ten days, depending upon the nature of the lesion as indicated by all of our studies, the patient was given a simple but restricted ulcer diet, which consisted of liquid foods every two hours, such as milk, albumen water, rice water, barley water, and cream. During the first week or longer the patient is instructed to return each morning with a practically empty stomach for topical treatment. In those patients who have shown pronounced subjective improvement, topical treatment may be given every other day, but to give daily treatment for a week or ten days is sure to bring great benefit to the patient. If the treatment is given gently and carefully, fifteen minutes to half an hour will necessarily elapse. First, simple lavage is instituted through a fractional tube. I have made use of a large three or four ounce Triumph syringe (glass) for instillation and aspiration purposes, also another more effective contrivance consisting of a four quart bottle with connections which through air pressure may fill the stomach and through vacuum creation may aspirate its contents. After the stomach has been thoroughly flushed with plain lukewarm water and emptied the next procedure is to instill a large quantity of weak sodium bicarbonate solution into the stomach. I made use of anywhere from 350 c.c. to 600 c.c., depending upon the patient's tolerance. About two tablespoonfuls or even less of bicarbonate of soda to a quart of water is used in making up the solution. This solution is allowed to remain in the stomach for a period of fifteen minutes or longer. We may, however, during this period withdraw a certain quantity and replace it with a similar amount, continuing the procedure throughout the entire period, in this way possibly getting rid of dissolved mucus.

Finally, the alkaline solution is removed and there is instilled into the stomach from one to three ounces of a colloidal silver solution of body temperature. This colloidal silver is of 0.05 per cent. strength and it can be diluted if desired. The silver solution is allowed to remain in the stomach and the tube is withdrawn. This concludes the topical treatment which may be given daily or less often as conditions may warrant. In those patients who have ulcer in the lowermost portion of the stomach or duodenum, the colloidal silver will of course have no difficulty in reaching the diseased area. In those individuals, however, who present evidences of ulcer higher up on the lesser curvature or at the cardiac end, it becomes necessary to give them this topical treatment while in the Trendelenberg position, and after the silver solution is applied the position should be maintained for at least fifteen minutes if possible. The Trendelenberg posture need not, however, be too extreme. This position enables the silver to gravitate toward the lesion and bathe it.

This treatment is given, if possible, once a day the first week, then when improvement is noted every second day the second week, and as subjective improvement continues is gradually cut down until finally the patient comes only once a week or even less often for it. It should, however, be given off and on for a few months. Simple increases in diet (bland foods) are ordered as improvement is noted. From the very beginning, it would seem wise to give antispasmodic treatment if indicated and also alkali treatment with such medication as sodium bicarbonate, bismuth or magnesium. The added medical treatment will, of course, depend upon the recognition of associated local or general disturbances. After the topical treatment has been reduced to once a week, it is usually my custom to prescribe this colloidal silver to be taken internally about twenty to thirty minutes after the alkaline powder is taken. I have always prescribed a mixture of powdered bismuth and soda three times a day one hour after each meal. The patient is instructed to take from one to two teaspoonfuls of the silver solution three times daily. This treatment is continued for weeks until definite improvement is admitted. There need be no fear of taking this particular colloidal silver internally. I have given it to large numbers of patients and have never noted any ill effects. The only objection at times is the manifestation of a metallic taste or momentary nausea.

The remarkable subjective and objective improvement obtained by this method of treatment cannot be overemphasized. The most intractable cases of ulcer, in which operations for relief had been performed, have been remarkably benefited by this treatment. In some cases it is necessary to indulge in topical treatment for a longer period of time than in others but one will be guided by the clinical progress noted. Sensible diet and adherence to the principle of alkalinization must be respected in practically every instance for a more or less lengthy period. I do not wish to subscribe myself to the belief that ulcers are permanently cured within a week or two by duodenal feeding and bed rest or any other method. I also believe that if we are to make headway in the direction of avoiding operative interference in cases of gastroduodenal ulcer, we will necessarily be forced to indulge in a direct treatment of the lesion. For that reason, I feel that topical treatment is a logical form of treatment.

SUMMARY.

The treatment comprises medical, dietary and topical application. 1. The medical treatment consists of the use of such medicaments per os daily as seem required, as, for instance, antispasmodics, alkalies, etc. 2. The diet should, of course, comprise such simple foods as are indicated only in conditions of gastroduodenal intolerance, such as milk, cream, water, egg albumen, etc., gradually working into the more complex articles of diet. 3. The topical treatment, the main feature of this method, consists of: a. simple lavage with lukewarm water so as to get rid of any accumulated or irritating material that may happen to be within the stomach; b. bathing with sodium bicarbonate solution for a period of ten to fifteen minutes or longer. This solution, because of its alkaline character, will neutralize the existing acidity and probably in this way through its thoroughness lessen the tendency that hyperacidity or hypersecretion may have of irritating the ulcer area. The osmotic nature of the solution may also exert a favorable influence in the direction of lessening hemorrhage as well as drying up the ulcer area. Mucus, which normally may be regarded as a protective secretion in the stomach, seems to act as a hindrance toward healing when medication is applied directly into the stomach, because it either combines with the medication introduced or because it interposes itself between the medication and the surface to be healed. By the use of this alkaline solution the mucus is well dissolved and after the stomach is cleansed the area to be treated should be rather accessible to the medicament to be instilled. A certain amount of this alkaline solution during its ten to fifteen minute exposure to the stomach, enters the duodenum in sufficient quantity to rid the duodenum of the presence of excess mucus, in this way preparing a duodenal ulcer for the medicament to be later introduced and left in the stomach.

c. The introduction into the stomach of from two to three ounces or more of a special colloidal silver solution (.05 per cent strength). This colloidal silver solution[1] is nontoxic, nonirritant and noncaustic. It is germicidal in its effect. This germicidal nature may be attributed to either the activity of the great number of colloidal particles, the power of adsorption that these particles may exhibit toward bacteria or other toxic substances present in the stomach or duodenum, the definite destructive influence that silver in such great surface exposure may have upon bacteria or toxins or the beneficial hearing that the silver colloid may have in improving the local or general resistance of the body against disease producing elements. At least, we may feel sure that this colloidal silver reduces the tendency toward infectivity to a minimum and in this way aids in a great measure the healing of ulcer processes. It is also very likely that the great surface exposure of the silver directly stimulates healing of the ulcer or improves the local tone of the tissues in this direction. The effect of the silver also is mildly astringent and the tissue seems to lose its vulnerability. It is not unlikely that this colloidal silver also tends to improve the local function of the organs to which it is applied and as a result may contribute in this way to ulcer healing. Whether this is brought about through the supposed beneficial influence that colloids are regarded to have upon the blood direct or upon the local nutrition is questionable. However, it is not my aim to touch upon the details of colloidal activity. My purpose is to present this article so that the excellent results obtained by this method might be made known.

Before concluding, I desire to mention the fact that we are also making use of colloidal iodine and other colloidal substances in the treatment of gastroduodenal ulcer and other diseases of the gastrointestinal tract. These substances are being employed not only locally but internally through mouth, intramuscular and intravenous means.

427 Park Avenue.

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[1]The colloidal silver employed in my work is marketed under the name of collene.

Diagnosis and Treatment of Gallbladder Disease With Special Reference to the Meltzer-Lyon Test.—Walter C. Alvarez (*Medical Clinics of North America,* September, 1922) states that in making the diagnosis of gallbladder disease, a good history is essential. This should include the investigation of supposed attacks of ptomaine poisoning, cholecystitis and pains, beginning in the liver region and radiating to the back and right shoulder blade and aggravated by jolting; belching and bloating, socalled biliousness, nausea, regurgitation of food, heart burn and vomiting; the fear of the patient to eat even though the food bears no relationship to the attack is most characteristic. The history of typhoid fever, chronic sinusitis, empyema, or any prolonged infectious process is suggestive, as is also the presence of arthritis, myocarditis and certain forms of headache and dizziness. The physical examination reveals a tender edge of the liver, a positive Murphy maneuvre and also fibroids of the uterus and other pelvic abnormalities. Röntgenography aids by excluding organic lesions (ulcer and cancer of the stomach), by revealing calculi or a thickened gallbladder and cardiospasm; the stomach shows hypertonicity and overactivity, sometimes contraction of the pyloric antrum, gastric stasis, deformity of the duodenal cap, exaggerated colonic haustration and an enlarged liver. Gastric analysis shows achlorhydria.

The patient may die or recover without any treatment. Remissions are frequent. The diet should be smooth and poor in cellulose. Carlsbad salts are useful. Sodium bicarbonate may be used for heartburn and belching. Hoffman's anodyne helps considerably in the attacks occurring at night. Paregoric, morphine and papaverin may be given for paroxysmal pain. Medical treatment is indicated under the following conditions, 1, In the early stages of the disease, with mild symptoms and long intervals of relief and in a good general condition; 2, in patients with symptoms of cholecystitis, associated with nervousness, menopausal storms, hypertension, or myocarditis; 3, in the presence of complications; 4, in patients who suffer after a cholecystectomy. Surgical treatment is indicated in: 1, patients, in whom the attacks are getting worse and more often; 2, cases of severe indigestion; 3, cases relieved by drainage of the gallbladder, but in which there is a return of pain, probably due to the formation of new calculi. Any gallbladder, handicapped by stones or the scars of previous disease, should be extirpated. The Lyon technic cannot affect stones already present, but it is worth trying if surgical help is postponed or refused.

Treatment of Infectious Processes in the Abdominal Cavity.—Egon Ewald Pribram (*Zentralblatt für Gynäkologie,* November 25, 1922) asserts that the primary closure of the peritoneum should be practised more often than heretofore in localized infectious processes with slight exudate and still more in diffuse processes, because very often the peritoneum is well able to take care of the pus that forms subsequently. This procedure has very great advantages: aside from the shortening of the period of convalescence and the resulting diminution of postoperative thromboses, the dangers from extensive adhesions. If drainage is necessary, only rubber or glass tubes should be used, but never gauze.

Proceedings of Societies

AMERICAN GASTROENTEROLOGICAL ASSOCIATION

Twenty-fifth Annual Meeting, Held in Washington, D. C., May 1 and 2, 1922.

DR. ALLEN A. JONES, of Buffalo, N. Y., in the Chair.

Relation of Organic to Functional Intestinal Disease.—Dr. ALLEN A. JONES, of Buffalo, N. Y., read a paper on this subject as his presidential address.

Rôle of Spasticity in Diseases of the Digestive Tract.—Dr. JACOB KAUFMAN, of New York, reported an instructive case of this kind, in connection with which he discussed the question of whether spasticity was not more frequently a causative factor in the development of diseases of the digestive tract than was considered at present.

Sausage Skin as an Aid in X Ray Esophageal Diagnosis.—Dr. ARMISTED C. CRUMP, of New York, presented a paper on this subject, in which he stressed its ease of passage in late, as well as in early, esophageal involvement. He described a special esophageal bougie for use with the sausage skin, and its method of passage on a flexible tip piano wire, as a guide. The instrument gives an accurate measurement of the point of obstruction and extent of involvement. The shadow of the measurements appear on the same plate, in contrast to the bismuth shadow of the esophagus. It may be used as a record of improvement in cicatricial strictures. It gives a clearly defined limit of a neoplasm, which is important for radium treatment and for mapping out a surgical operation. The author exhibited lantern slides showing the normal esophagus, strictures due to acid or caustic soda, and diverticular neoplasms.

Clinical Importance of the Chronic Changes in the Appendix Which Are Discovered by the X Ray.—Dr. FRANKLIN W. WHITE, of Boston, first discussed the important direct signs, including tenderness, fixation, kinking, change of shape, and abnormal position. He then took up the question of the significance of the filling or nonfilling of the appendix, and its relation to the kind of barium meal used. Other points discussed were the time of emptying the appendix; the cause of beading, or segmentation; the limited value of indirect signs, such as pyloric spasm, gastric residue and ileal stasis.

Under the heading of the Clinical Importance of the Signs, Dr. White considered the question of whether there were any normal appendices in adults and whether obliteration was a normal or an abnormal process. He said that the x ray discovered many things about the appendix which might or might not trouble the patient; such as limited mobility, small fecal masses, peculiar shapes, obliteration of the lumen, beading, and moderate delay in emptying. Their discovery, he stated, was frequently no reason for removing the appendix. The most frequent signs in the group requiring operation, and the signs found in the operative group, were then considered. Dr. White illustrated by lantern slides a study of a series of patients from one to four years after an x ray examination that showed chronic changes in the appendix.

Peptic Ulcers With Deformities of the Viscus (as Indicated by the X Ray) Changed for the Better by Treatment.—Dr. MAX EINHORN, of New York, stated that twelve cases of peptic ulcers with deformities of the stomach, pylorus or duodenum (as evidenced by the x ray) had been observed in one year. There were among them five cases of penetrating ulcer of the lesser curvature of the stomach, one of penetrating ulcer near the pylorus, and six of duodenal ulcers with marked deformities of the first position of the duodenum. Duodenal elimination treatment effected a marked amelioration, if not a cure, in all of them. The deformities of the viscus had either disappeared entirely or had given place to a more normal appearance of the latter. The cases showed clearly that even old, far advanced, peptic ulcers were amenable to medical treatment.

Vails in the Right Hypochondrium.—Dr. LEWIS G. COLE, of New York, said that vails in the right hypochondrium involved the pars pylorica, cap, duodenum and colon, and extended from the hollow viscera to the gallbladder and liver. These vails may be either congenital or acquired; and when congenital, were due to abnormalities of the anterior mesogastrium, as was emphasized by Harris. When acquired, they were slight vailing, nonobstructive adhesions, usually of gallbladder origin, described by Morris as "cobwebs in the attic, of gallbladder origin" without a grossly diseased gallbladder and without gallstones. Dr. Cole considered these of röntgenological significance for two reasons: 1, because they might be mistaken for postpyloric ulcers, and, 2, because some were of clinical significance. The characteristic röntgen findings were referred to as having been published recently. The symptomatology was classified as far as possible, and the characteristic symptoms emphasized. The author said that the difficulties of detecting these vails and the likelihood of overlooking them at a surgical exploration, unless the surgeon was familiar with them, was very great. The failures and success of the surgical procedure in the relief of the symptoms was analyzed.

Studies on Colon Function.—Dr. MARTIN E. REHFUSS, of Philadelphia, had made a study of colon function by means of x ray examination. He described the use of the irrigation method of fractional interpretation of results, which had been used in a clinical study of several thousand cases. He dilated on important points in colon retention and the points to be observed in the study of chronic constipation.

Underlying Causes in the Pathology of the Colon.—Dr. JEROME LYNCH, of New York, stated that the nerve supply to the gastrointestinal canal was developed segmentally. Each zone, or segment, as had been shown by Keith, he said, had its own pacemaker and its own rhythmical contractions. Disturbances in any segment are reflected in the others, and will interfere with the normal propulsion of food along the alimentary canal. These interferences may be congenital deformities or acquired. The congenital deformities may not result in pathological changes until adult age is reached, or they may be precipitated by improper dietetic habits.

Some of the most prominent congenital defects were ileocecal insufficiency, nonfunction of the cecum, elbow deformity of the ascending colon, adhesions of the gallbladder to the transverse colon or septum, and overdevelopment of the sigmoid. The acquired deformities were those due to chronic appendix, pericolitis, colocystitis, and perisigmoiditis.

Treatment of Spastic Constipation.—Dr. Charles D. Aaron, of Detroit, in this paper, laid particular emphasis on physical and mental relaxation of the patients, diet, medication and local applications.

Pancreatic Carcinoma: A Clinical Review.—Dr. George B. Eusterman, of Rochester, Minn., enlarged on the difficulties attending the recognition of pancreatic disease, particularly in its incipiency, and said that the differential diagnosis must be made between this and intraabdominal conditions that might simulate pancreatic disturbance. He then gave a brief discussion of types of lesions of this organ and their comparative frequency. Modern aids to diagnosis, and their practical application, were then considered. The author gave a clinical summary of a series of cases of pancreatic cancer, with the report of a recent interesting case.

Some Observations on the Gastric Disturbances Which Occur in Old Age.—Dr. Julius Friedenwald, of Baltimore, read this paper, in which he considered indiscretions in diet, the influence of diseases of other organs beyond the stomach itself, infectious diseases, focal infections, degenerative changes, arteriosclerosis, syphilis, toxemia and disturbances of the nervous system. The gastric secretion and motility in old age, as compared with these same functions in young adults, were discussed. The following diseases, as they occurred in old age in a series of three hundred cases, were analyzed: ulcer, cancer, dilatation, ptosis, syphilis, secondary gastric affections and visceral arteriosclerosis.

Treatment of Carcinoma of the Esophagus.—Dr. Elmer B. Freeman, of Baltimore, described the methods employed in the diagnosis of carcinoma of the esophagus, and then referred to a simple method of esophagoscopy and to an easy method of removing esophageal contents. The endoscopic appearance of carcinoma was then described. The author called attention to the necessity of frequent esophagoscopic examinations while undergoing treatment.

Hydrogen Ion Concentration Method of Gastric Analysis.—Dr. John H. King, of Baltimore, considered this subject under the following headings: 1, A clinical consideration of acidity; 2, determination of acidity, first by the electrometric method and second by colorimetric method; 3, buffers and indicators; 4, the acidity of stomach contents, and the significance of pH values in gastric contents; 5, the colorimetric determination of free hydrochloric acid, with a description of the method; 6, combined acidity and buffer value; 7, acid deficit of gastric contents; 8, analysis of results in clinical cases, in cases showing free hydrochloric acid—buffer value, and in cases showing achylia gastrica—acid deficit and buffer value; 9, the clinical significance of acid deficit and buffer values of gastric contents.

Studies on Gastric Secretion.—Dr. A. H. Aaron, of Buffalo, N. Y., in this paper, discussed the clinical value of the single gastric analysis, based on the study of a series of normal and pathological cases.

Local Treatment of Gastric Irritation.—Dr. Charles G. Stockton, of Buffalo, presented a paper dealing with measures of local treatment for the relief of gastric distress, including pain and anorexia, resulting from gastritis, erosion, ulcer and irritability from other conditions.

Diagnosis of Acute Intestinal Obstruction.—Dr. A. McGlannan, of Baltimore, said that acute intestinal obstruction was the most fatal of acute abdominal crises. The mortality had not been greatly reduced by aseptic surgery. Improvement in the statistical record of any large series of cases was to be credited, he thought, to earlier operation, rather than to improved technic. The cure of the patient rested on recognition of the lesion in the early stage, with prompt operation. The diagnosis of the general condition was more important than the identification of the etiological variety. The differentiation of obstruction from other lesions having similar symptoms was considered, and the limitation of nonoperative procedures discussed.

Early Diagnosis of Carcinoma of the Upper Colon.—Dr. Milton M. Portis and Dr. Sidney A. Portis, of Chicago, presented a paper on this subject, in which they stated that carcinomata of the colon were not as rare as commonly supposed. They were most common in the sigmoid, but might be found anywhere. Adenocarcinomata were the most frequent, but scirrhous and colloid growths were found. Pain was the most important symptom. Gastrointestinal complaints, with loss of weight and anemia, were present. Constipation alternated with diarrhea. The stools showed gross blood in some of the cases, while occult blood was found in all. Occult blood was one of the early findings, and the one of greatest significance. X ray evidence of a filling defect was an important sign. Obstruction was noted in advanced cases. In the differential diagnosis, all chronic intestinal conditions must be excluded. The authors gave a report of four cases with early diagnosis and operation. Lantern slides were exhibited, showing x ray evidence of carcinomatous lesions.

Selection of Patients Giving Indication and Contraindications for the Use of Medical Drainage of the Gall Tract.—Dr. B. B. Vincent Lyon, of Philadelphia, stated that the first requisite was to learn the type of gallbladder disease which could be treated by nonsurgical biliary tract drainage, and those which could not and should not be so treated until after they had been referred for operation. In a general way, the majority of all cases, he said, could be divided into several groups, in so far as the beginnings of their treatment are concerned. These groups are as follows:

Group A.: Cases that imperatively required surgery and that had relatively unimportant or no surgical contraindications. Group B.: Those cases that might unquestionably be considered surgical, but in which there were such serious contraindications as not to justify the surgical and anesthetic risks, if nonsurgical drainage could be shown to be an adequate alternative method. Group C.: Borderline cases, formerly considered surgical, but which now might do as well or better by medical drainage of the gall tract. Group D.: Early cases, for which surgery was no longer indicated, since similar cases had made satisfactory recoveries by medical drainage. Group E.: Genuinely surgical cases, to be preceded by preliminary medical drainage. Group F.: Genuinely surgical cases, to be followed by medical drainage. Group G.: Essentially medical cases: 1, Catarrhal jaundice; 2, arthritis; 3, typhoid carriers.

Intestinal Infection With Entamœba Histolytica as a Factor in Arthritis Deformans.—Dr. Sidney K. Simon, of New Orleans, La., said that the finding of Entamœba histolytica in the periarticular tissues in two cases of arthritis deformans had been reported recently by Kofold. The suggestion had been made that this protozoal organism might be a causative factor in this, as well as in other types of chronic polyarthritis. The author reported a case in his experience presenting extensive arthritis changes. The presence of entamœbic infection of the intestinal tract in an active form had likewise been demonstrated in his patient.

Chemical Composition of Intestinal Toxines; Pharmacology Thereof, and Treatment of Intestinal Toxemia.—Dr. John C. Hemmeter, of Baltimore, Md., said that the chemical structure of p-hydroxyphenylethylamine is allied to that of the alkaloids of ergot and to adrenalin. He referred to the blood pressure raising effect, enterotoxins in diet, the effect on the differential blood count, intestinal bacteria, diet, and enterotoxin production. He then described the method of diagnosis by detection of para-hydroxyphenylacetic in the urine; the symptoms of hypertonicity of the sympathetic system, etc., and the biological test with the blood of the patient. The treatment consisted in restriction of diet, intestinal disinfection, the use of autogenous vaccines, lavage of the colon, etc.

The Diagnostic and Therapeutic Value of Transduodenalobiliary Drainage.—Dr. Elmer L. Eggleston, of Battle Creek, Mich., read this paper, in which he said that the evolution of new diagnostic methods or therapeutic methods should be welcomed by the profession. While they must be subjected to rigid inspection, they should not be condemned as worthless without an unprejudiced trial. The work of Doyon, Oddi and Meltzer, he said, formed the groundwork for a study of the bile derived apparently from different sources, and certainly revealed changes from the normal in its macroscopical and microscopical appearance, its chemical composition and its bacteriological and cytological findings. This should aid us in differentiating certain right upper quadrant lesions, at present difficult of diagnosis, and might lessen the necessity of resorting to so frequent surgical exploration to establish a positive diagnosis. The author said that their observations, covering a series of six hundred duodenobiliary drainages in three hundred cases, would warrant the belief that while it was helpful diagnostically, it did not take precedence over other procedures of proved value. Deductions from bacteriological findings were questionable, because of the great possibility of contamination from other sources. Bacteriological studies on bile removed from gallbladders immediately after operation frequently failed to corroborate preoperative drainage findings. The opportunity afforded for the study of the pancreatic ferments should aid materially in determining functional disturbances of that gland in a way superior to any yet advanced. The therapeutic value of the procedure was still undecided; in selected cases, it was apparently helpful. The author gave a brief review of such cases.

Visceral Adhesions and Bands; Normal Incidence in Relation to Age and Sex.—Dr. John Bryant, of Boston, Mass., stated that the existing data were contradictory and inadequate. He described the method of investigation, and gave his conclusions, based upon 1,131 observations upon 297 unselected conservative postmortem sections of all ages and both sexes. There was a surprising frequency of adhesions in the fetus of both sexes, but of a type very different from those found in the second half of life. The age of forty was found to be a critical one for both sexes, there being almost no increase in frequency above the fetal rate until this age. From forty years to old age, there was a marked increase in the complex type of adhesions, especially in the female. Findings were given for individual organs in both sexes with regard to age. Nearly all of the foregoing papers were fully discussed.

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Letters to the Editor.

A NEW SIGN IN SUBACUTE AND CHRONIC APPENDICITIS

Los Angeles, Calif., *April* 19, 1923.

To the Editor:

During the past two years I have particularly noted that there could be elicited, very often, a tender point in the right tenth costal interspace in the axillary line or slightly posterior. This tender point is analogous to the reflex tender points elicited quite often posterior to the right or left of the spine in cases of gallstones (or gallbladder irritation) and gastric ulcer. Though not a great many cases have been seen, yet I feel that in these cases, about 110 to 120 in number, the sign has been present sufficiently frequent to warrant further study.

The investigation as to the sign in the acute cases has not been nearly so great, for the reason that the general practitioners refer their acute cases immediately to the surgeon for operation and this study was not readily available. In the limited few, this sign was often present. Many theories could be advanced for this sign but it is deemed advisable not to advance such until further studies are made.

Samuel Floersheim.

1015 Story Building.

Abstracts from Current Literature

GASTROINTESTINAL DISEASES.

Atropine in the Treatment of Congenital Pyloric Stenosis.—Murray H. Bass (*Medical Clinics of North America,* November, 1922) reports his results in several cases of congenital pyloric stenosis with large doses of atropine. A freshly prepared solution of atropine from a reliable source is essential and the minimum dose should be allowed to become effective as rapidly as possible. It is well to begin with one drop of a one in one thousand solution of atropine sulphate in water, given with each feeding; if the vomiting is not controlled by it, an additional drop should be given at the following feeding. The author has given as high as seventy-two drops in twenty-four hours. In the severer cases atropine is given hypodermically. The amount of atropine necessary to control the vomiting varies in individual cases. The guide to tolerance of the drug is flushing of the skin. In patients who are recovering the atropine is gradually diminished rather than stopped suddenly. The atropine merely serves to remove the pyloric spasm and every other possible aid should be used to maintain the nutrition of the child. The best trained nursing is necessary in these cases. The best type of food is determined by the physician in every case individually. Gastric lavage before each feeding may be necessary or gavage may have to be applied. Sufficient fluids must be administered either by mouth, or subcutaneous injections of normal saline solution, or by the Murphy rectal drip. In very debilitated infants transfusion may be advisable. The general hygienic measures must also be looked after. Cases of true stenosis must be differentiated from those of severe spasm by the presence of a palpable tumor. Every case of congenital pyloric stenosis should be given the benefit of a thorough course of treatment with atropine before resorting to surgical intervention.

Actinomycosis of the Gastrointestinal Tract: A Report of Fourteen Cases.—James Chester Brogden (*Journal of Laboratory and Clinical Medicine,* December, 1922) studied fourteen cases of actinomycosis of the gastrointestinal tract which have occurred at the Mayo Clinic since 1909; the disease, therefore, is not such a rare one, thirteen of the fourteen cases having occurred during the last four years. The prognosis in such cases is unfavorable, the mortality being from sixty to seventy per cent. Brogden draws the following conclusions from his investigation: The acute form, usually beginning with a typical attack of acute appendicitis, is more common. There may be severe or several mild attacks; the chronic form is insidious in onset with very slight indefinite pain in the lower abdomen, or practically no pain, the mass being the first sign of the disease. The characteristic symptoms in both forms are marked loss of weight and strength, pronounced anemia, induration, and a bluish red discoloration of the skin over the mass and around the sinuses, and pain down the right thigh with flexion of the thigh on the abdomen. Constipation was the rule in the fourteen cases, diarrhea not being a constant symptom. Actinomycosis bovis, an anaerobic organism, is the cause of the disease; the ileocecal coil is most often affected; the stomach and upper small intestine being practically immune. Predisposing factors are carious teeth, diseased tonsils, bad hygienic conditions, etc.; whether the disease is transmitted from cattle to man is doubtful, though three of the fourteen cases gave a definite history of exposure to lumpy jaw in man. A chronic discharging sinus in the lower abdomen, particularly following operation and drainage of an appendiceal abscess, should arouse suspicion of actinomycosis, and repeated examinations for the ray fungi should be made, over long periods, with pathological examination of the tissue from the mass or from the walls of the sinuses, before actinomycosis can be ruled out. The best hope of cure is offered by early operation and excision of the diseased area before spread of the infection to the surrounding tissues, frequent röntgen ray and radium treatments over the abdomen and large doses of potassium iodide by mouth and sodium iodide intravenously. In the later stages radical surgical measures are of no help, death usually occurring from cachexia and extension of the disease to the liver and thorax.

Forty-four Cases of Simple Perforation of Gastric and Duodenal Ulcers, With a Simple Method of Surgical Treatment.—E. R. Schmidt (*Acta Chirurgica Scandinavica,* December 22, 1922) states in his résumé that the surgical condition of a patient is dependent upon two things, viz., his physical condition previous to the operation and the severity of the peritonitis after the perforation. If a patient is young, in good physical condition, has had an ulcer for some time so as to allow the abdomen to react by forming adhesions or developing a resistance, the patient will be able to combat a peritonitis of some duration. If the peritonitis is generalized, the young patient with a good constitution has a better prognosis than a patient young or old with a poor constitution. Time plays an important rôle. The greater the time elapsing between the operation and the perforation, the more marked is the peritonitis and the reaction on the system. The physical condition of the patient before perforation and operation and the severity of the peritonitis are the main factors upon which the mortality in any series will depend.

There are other factors, such as the tendencies to localize the peritonitis, the surgical procedure and complications (subphrenic abscess, pneumonia, emboli, empyema, thrombosis, bronchopneumonia) which play a less important rôle, but must be taken into consideration. In opening the abdomen, the high median incision was used in all cases. This incision immediately exposes the stomach and duodenum so that a minimum of handling is necessary. In treating the peritonitis in forty-two cases the abdomen was irrigated with normal saline solution at 40° C., and in two cases the localized area was sponged with sponges moistened in normal saline solution. Thirty-nine abdomens were closed without drainage, thus shortening the postoperative course, favoring early restoration of peristalsis and reducing the risk of postoperative ileus and the forming of adhesions. The average length of time the patients remained at the hospital was 33.39 days. There were ten cases of duodenal ulcer in the series, nine in males and one in a female. They were operated on an average of 10.75 hours after the perforation, with no deaths.

The author draws the following conclusions: 1. Perforation may occur at any age; but necessarily occurs more often during the ulcer bearing stage. 2. Mortality depends for the most part on three factors: the time elapsing between perforation and operation, the severity of the peritonitis, and the physical condition of the patient at the time of perforation. The mortality rates of the different series published will vary as these factors vary in the cases that comprise the series. 3. Gastroenterostomy is a superfluous procedure in the treatment of a perforated ulcer. By employing gastrostomy instead of gastroenterostomy the mortality rate can be reduced from two to 6.5 per cent. 4. Gastrostomy serves as a safety valve. Nourishment can be given through it even before the patient awakens from the narcosis. All the postoperative discomfort of eructations, hiccough, nausea and vomiting are eliminated. If lavage should be necessary, it is a simple procedure and not disagreeable to the patient. 5. Primary suture of the abdomen, after a thorough irrigation of the abdomen with normal salt solution at 40° C., makes for a smooth postoperative recovery. 6. Of twenty-two patients reexamined, only two had had to be reoperated upon for a recurrence of ulcer. 7. The patients on leaving the hospital must be forcibly impressed with the fact that an ulcer diet is essential for their continued freedom from a recurrence of the ulcer and they should remain under medical control for some time. 8. No cancer of the stomach developed in this series. 9. A high median line incision has proved most satisfactory. 10. Excision of the ulcer removes pathological tissue, allows approximation of the edges so that there is no protruding ulcerated surface on the inside, reduces the tension of the sutures, affords a better hold for the sutures and leaves less scar tissue after it is healed. 11. Ulcer patients should be warned of the possibility of recurrence of both ulcer and of perforation.

Chronic Digestive Insufficiency (Celiac Disease).—W. McKim Marriott (*Medical Clinics of North America,* July, 1922) states that the cardinal symptoms of celiac disease are emaciation, great fluctuation in the weight, protruding abdomen, large foul, soapy stools, and specific intolerance to fat in the food. It must be differentiated from abdominal tuberculosis, Hirschsprung's disease and emaciation from improper feeding, especially with a diet of much bulky food with little fat and protein. This disease is a purely functional digestive insufficiency.

The treatment includes a diet of sufficient calories, with protein and such forms of carbohydrates as do not readily ferment; it must not neutralize the slight amount of gastric hydrochloric acid; and it must also contain the three vitamines—fat soluble A, the water soluble B, and the antiscorbutic vitamines—and iron. The basis of the diet is skimmed lactic acid milk (buttermilk) in the amount of a quart a day; to this, curds from skimmed or a dried casein (larosan, casec, etc.) should be added. Codliver oil is given for the fat soluble A vitamine, one to two teaspoonfuls a day. For the water soluble B vitamine and iron, two to three teaspoonfuls of powdered spinach in a little water are added to the milk mixture. Orange juice (one tablespoonful) supplies the antiscorbutic vitamine. Additional protein is given in the form of rare, scraped beef or soft boiled egg. The starches include well cooked farina, cream of wheat, or baked potato. Additional calories are obtained with one half to three ounces of commercial dextrin or brown corn syrup. If necessary, five to ten c. c. of normal hydrochloric acid a day is added to the mixture before feedings for two or three days at a time only.

Lymphosarcoma of Intestine. — P. A. De Noyelles (*Annals of Surgery,* August, 1922) concludes as follows: two cases of lymphosarcoma of the intestine are described, one of tumor of the jejunum, the other of the ileum. In one instance the tumor was a diffuse infiltration of the intestinal wall, an annular type of growth. In the other case a lymphosarcomatous polyp was found which gave rise to an intussusception. The microscopic picture leaves much speculation as to the origin of the tumor cell, but in these two cases the predominant cell is one which resembles a great deal the transitional large mononuclear cell of the blood. Lymphosarcoma of the intestinal tract is difficult of clinical diagnosis, the signs being simply those of malignancy, with partial obstruction being rather constantly present. X ray examination was of no help in these two cases. Treatment consists of the radical removal of the primary growth with as much of the metastases as is possible. Improved methods of radium application might be a valuable therapeutic adjunct. Chronic irritation, possibly a specific toxin, may play an important rôle in the genesis of lymphosarcoma. The histology of infectious granulomata of the intestine often simulates this tumor. Perhaps lymphosarcoma is only one of the many bizarre late pictures of lesions which were at one time of the nature of Hodgkin's disease or lymphoblastic or lymphocytic aleucemia.

Angioma of Gastrointestinal Tract.—Judd and Rankin (*Annals of Surgery,* July, 1922) state that angiomas of the gastrointestinal tract are rare and may simulate malignant conditions. When they occur in the stomach, they are generally found on the posterior wall in the common location for malignant conditions. Similar to other benign tumors of the stomach, angiomas are occasionally found in young persons. There may be no definite gastric upset, the main complaint being weakness and epigastric discomfort. The acid values of the gastric secretion are generally normal and the general condition of the patient is usually much better than that of the patient with a similarly located malignant lesion. Angiomas of the stomach, while generally small, may grow to a large size. They are usually soft and covered with mucous membrane. Histologically, they are composed of fine bloodvessels and masses of fibroblasts and endothelial cells. At the Mayo Clinic three patients with angioma of the stomach and one with angioma of the duodenum have been operated on in the past two years; two of the patients were young, and two were of cancer age. The advanced age of these two patients and the x ray findings, similar to those in malignancy, suggested inoperable malignant lesions. In all cases the tumor was removed and operation was followed by an excellent immediate and late result.

The Gallbladder.—M. F. Porter (*Surgery, Gynecology, and Obstetrics,* July, 1922) asserts that routine removal of the gallbladder is based upon the following assumptions: 1. That the gallbladder is an unimportant organ and that its removal is followed by no untoward results. 2. That all gallstones have their origin in a primary cholecystitis and that recurrence or continuation of symptoms following cholecystostomy is usually due to the fact that the gallbladder was not removed. The facts are that all evidence at hand supports the contention that the gallbladder is an important organ and evidence is not yet at hand to warrant the conclusion that its removal leads to no serious consequences. Cholecystic disease including gallstones frequently if not usually originates in the liver. Routine cholecystectomy frequently fails to cure and leads to the removal of healthy gallbladders in over four per cent. of cases.

Relation of Achylia Gastrica to Chronic Focal Infections and Pernicious Anemia.—Louis A. Levison (*Journal of Laboratory and Clinical Medicine,* August, 1922) cites the history of three patients for the purpose of calling attention to the sequence of focal infection, achylia gastrica, and pernicious anemia. In his conclusions Levison states that the assumption is justifiable that long continued foci of infection may depress the gastric secretion and produce an achylia gastrica. However, that the latter condition in itself is a predisposing cause to pernicious anemia has not been shown on the basis of any evidence yet brought forward. Clinically there is reason to believe that focal infection of long duration may depress the function of the bone marrow and prevent the formation and development of new red blood cells. With these points in mind Levison urges that when achylia gastrica is discovered in a patient showing evidences of chronic focal infection, that the possibility of pernicious anemia developing be kept in mind, and that all possible efforts be made to eliminate the focal infection.

Epidemic Diarrhea. An Analysis of Eighty-four Fatal Cases.—Donald Paterson (*Lancet,* August 12, 1922) found: 1. That fatal cases of epidemic diarrhea fall into two groups—those with and those without a previous history of indigestion, the two types being indistinguishable clinically except for the history. 2. The involvement of the bowel was equal in frequency and extent in both groups. 3. The duration of the disease did not influence the extent of the pathological lesion in the bowel. 4. The most common lesion was a gross fatty change in the liver—an almost invariable finding in the previously healthy group. 5. The infectiousness of this disease was not strikingly apparent in the fatal cases. 6. The observation of Ballard—that the four foot earth temperature reaching 56° F. is synchronous with the outbreak of diarrhea—was borne out in 1921. 7. The feeding both during and after the acute symptoms is of the utmost importance and the original symptoms are reproduced when certain foods are given in some cases. 8. The administration of salines subcutaneously and intraperitoneally and fluids by mouth is essential to make up for the losses of fluid and dehydration; but only when the symptoms are urgent does the intraperitoneal method seem to be the best and it should be given at not more than 100° F., as it is not without danger.

The organisms most frequently isolated, in addition to the Bacillus coli communis, was the Bacillus coli anaerogenes; the other organisms were: Bacillus dysenteriæ, Bacillus paratyphosus B, and an unidentified bacillus. Morgan's No. 1 bacillus was not isolated in any case. The Bacillus coli anaerogenes may or may not have had an etiological significance and it was found in both the fatal and recovered cases; it also showed several strains.

Cancer of Bile Ducts.—K. Renshaw (*Annals of Surgery,* August, 1922) concludes as follows: Malignancy of the bile ducts, while less common than that of the gallbladder, is not uncommon. The ratio in a series of 104 cases of malignancy of the biliary ducts and gallbladder was one to four. Carcinoma is the most common type of neoplasm found. Gallstones would seem to be of greater etiological importance than is generally considered. Males and females are affected in the ratio of about two to one. About two thirds of the cases occur between the ages of fifty and seventy years. A diagnosis of malignancy of the ducts is uncertain. After a diagnosis of obstructive jaundice has been made, exploration is generally advisable. From the viewpoint of slowness of growth and rarity of metastasis, surgical treatment should be favorable.

Carcinoma of the Stomach.—F. N. G. Starr (*Canadian Medical Association Journal,* April, 1921) maintains that an inoperable primary carcinoma of the stomach may become operable following a simple palliative gastroenterostomy. In a locally inoperable carcinoma of the pylorus, with no metastases, an anterior gastroenterostomy is preferable to the posterior, in view of the possibility of a subsequent resection being possible. All palliative gastroenterostomies should be followed by x ray examination. In placing the anastomosis, following stomach resection, care should be taken to have the efflux leave the stomach and enter the jejunum at the lesser curvature, as this markedly decreases postoperative nausea. The hope of increased operability and prolongation of life lies in early diagnosis. This should mean that all patients suffering from chronic gastric distress, should be examined by means of x ray after an opaque meal. Serial plates should be made to avoid errors in diagnosis resulting from the use of a single plate. In addition, it is extremely important to have the plates interpreted by one who is thoroughly conversant with gastrointestinal roentgenology.

Chronic Duodenal Ileus.—D. P. D. Wilkie (*British Journal of Surgery,* October, 1921) concludes that chronic duodenal ileus from compression of the third part of the duodenum by the root of the mesentery is a clinical and pathological entity. It may be associated with duodenal or gastric ulcer, and with biliary and pancreatic lesions. Visceroptosis, and congenital lack of fixation of the proximal colon, predispose to its development. Fixation of the proximal colon may relieve certain cases. Drainage of the dilated duodenum by duodenojejunostomy is the most certain method of treatment, and the only one suited for well developed and late cases. Acute dilatation of the stomach, either idiopathic or postoperative, is probably merely a gross manifestation of a chronic condition which had been present previously.

Origin of Hunger Pains and Their Significance in the Diagnosis of Ulcer.—Heinrich Schur (*Wiener klinische Wochenschrift,* August 10, 1922) states that painful gastric ulcer is regularly associated with local inflammatory symptoms and swelling of the regional lymph nodes, to which the pains may be attributed. The pains are not caused by mechanical (food) or chemical (pepsin hydrochloric acid) irritation, but by the more or less inflamed ulcer area as a result of external pressure and contractions, which pull on the musculature surrounding the inflammatory foci. Hunger pains are absolute proof of an inflammation in the region of the pylorus; as a rule the lesion is an ulcer, but the diagnosis is made absolutely certain by the periodicity.

Chronic Gastritis.—Oskar Stoerk (*Wiener klinische Wochenschrift,* November 2, 1922) shows that the genetic pathological process responsible for chronic gastritis is a chemical inflammation resulting from disturbances of the protection against autodigestion of the stomach; if the intensity of this change is severe enough, healing does not occur, but instead there results the formation of a pathological form of mucous membrane—the socalled pseudopyloric mucosa—which, as a rule, seems to be capable of a return to normal and, moreover, seems to lead to a disappearance of glandular tissue after a certain time and thus to an atrophy of the gastric mucous membrane. The possibilities of spontaneous healing, as through therapeutic and dietetic influences, is only imaginable more in the sense of a prevention of further dissemination along the surface.

Effect of Duodenal Contents Upon Gastric Secretion.—In a preliminary report, F. Kauders and O. Porges (*Wiener klinische Wochenschrift,* October 26, 1922) state that acids coming from the duodenum diminish the secretion of the stomach, which finding may well be correlated with the physiology of the pyloric reflex; with this mechanism an excessive secretion of gastric juice may be regulated. The reverse is to be expected from alkalies—which clinical experience would suggest—namely, that after the administration of alkalies in excess during gastric digestion there soon appears a recurrence of free acid in the stomach. This finding was demonstrated repeatedly. The author's experiments lead him to believe that an inhibition emanating from the duodenum is unlikely and it is more likely that there is an excitation. The osmotic and chemical stimuli, such as hypertonic and medium strength sodium chloride solutions and even sugar solutions acting upon the duodenum, reduce the gastric secretion still more; in fat, the inhibitory effect of the fatty acids also come into play.

Amebic Liver Abscess. — Leonard Rogers (*Lancet,* March 25, 1922) concludes that the vast majority of cases of large amebic liver abscesses, in which no bacteria are demonstrable, can be easily cured by repeated aspirations, together with the all important administration of ipecacuanha and emetine, which destroy the specific amebæ. In this way the mortality is reduced to one fourth of that resulting from the usual open operation. In the few exceptional cases, which require incision, sterile siphon drainage should always be employed so as to avoid the fatal secondary bacterial infections common formerly after the open drainage operation.

The Cause of Certain Acute Symptoms Following Gastroenterostomy.—Russell L. Haden and Thomas G. Orr (*Bulletin of the Johns Hopkins Hospital,* January, 1923) report a study of three patients in whom rather severe symptoms occurred following gastroenterostomy. The patients emphasize the importance of an upper intestinal tract intoxication as the cause of certain postoperative reactions, which are attributed in these cases to a poison probably formed in the duodenum following the gastroenterostomy. The mechanical factor has not been determined, but it is probably an obstruction to the outflow of the duodenal contents. The patients showed a marked increase in the nonprotein nitrogenous bodies of the blood, in general proportional to the severity of the intoxication. The two cases on which chemical studies of the urine were made showed with no food intake an enormous excretion of nitrogen, and a very striking suppression of chlorides. One case showed a marked alkalosis, as evidenced by the very high CO_2 combining power of the blood plasma.

Therapeutic Value of Vomiting in Intestinal Obstruction and Acute Appendicitis.—Sir Charters Symonds (*Practitioner,* March, 1923) maintains that the free administration of fluids, principally water, in suspected intestinal obstruction or acute appendicitis, is sound practice. After operation vomiting should be encouraged, especially in advanced cases, until the rejected material is free from bile. When hiccough is present and vomiting does not follow the free exhibition of fluids, the stomach should be washed out, in severe cases every four hours, in others two or three times a day. The injured bowel will maintain obstruction for two to four days, and during this period our best treatment is to encourage vomiting. To permit the reflexes to come into operation as soon as possible the preoperative dose of morphine should be omitted, the operation should be as brief as possible, the minimum amount of anesthetic should be employed, and morphine should be withheld until the rejected material is free from bile. When free vomiting has occurred the symptoms of toxemia are absent, and the prospects of recovery after operation are increased.

Factors in Dyspepsia.—Francis W. Palfrey (*Boston Medical and Surgical Journal,* October 12, 1922) says that most chronically disordered stomachs can still receive without symptoms most of the articles of a normal diet if only these are taken with thorough mastication in sufficiently small amounts. Patients in managing their own diets commonly have their attention too much fixed upon what they can eat, and pay too little attention to the amounts. Most dyspeptic patients are impatient and meddlesome with their stomachs, rather than gentle and systematic, and so become confused and discouraged. Osler mentions three and one quarter ounces of meat, two medium slices of stale bread, and one ounce of butter three times a day as a useful diet in hyperacidity. Smaller amounts of the same foods can be taken by most dyspeptic patients, and it often serves as an encouraging introduction to treatment to show the patient that he can take even small amounts of these substantial foods which he may formerly have feared, giving him reason to hope that he may gradually resume a normal diet.

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Intestinal Protozoa.—Marshall C. Cheney (*Medical Clinics of North America,* September, 1922) emphasizes the importance of routine examinations of the stool in protozoal conditions of the intestine. A portion equal in volume to a walnut is sufficient and it should be taken from the softest portion of the stool, placed in an airtight container and sent immediately to the laboratory to be examined immediately; it is still more desirable to have the specimen collected in the laboratory to allow an earlier examination. The following points should be investigated: 1, the gross appearance—as to color, mucus, blood or pus; 2, the examination of wet smears for excess food, amebæ, flagellates, ova, pus, blood, balantidium and spirochetes; 3, the same examination after the addition of five per cent. potassium iodide in salt solution, saturated with iodine for starch residue and also to bring out the characteristics of cysts; 4, the benzidin test for occult blood. If the occasion demands it, the following procedures may be added: 5, the iron hematoxylin stain for the identification of parasites; 6, the brine loop concentration test for ova (Kofoid); 7, the gram stain of flora; and 8, cultures for the typhoid dysentery, or other groups, or for yeasts and molds.

The Pelvic Appendix.—Rutherford Morison (*Lancet,* September 9, 1922) concludes that inflammation of the appendix may mislead the expert diagnostician, as early abdominal pain and fever may both be absent. Not until perforation has occurred, generally at the distal end, are urgent symptoms noted. This is due to the fact that tension is not present, because this type of appendix can empty itself and the first serious pain results from perforation. Frequency of micturition, especially in boys, and retention of urine (rarely) are early symptoms. Careful rectal examination and a blood count may aid in establishing the diagnosis. A pelvic abscess may result from the localization of a diffuse peritoneal infection, from a leaking appendiceal abscess in the right iliac fossa, or from a leaking pelvic appendix. Rectal tenesmus is the most suggestive symptom of a pelvic abscess. The treatment of an inflamed pelvic appendix is early extirpation, except after the second day following a perforation and in the conditions of intestinal distention or acute illness, in which cases medical treatment is indicated until the abscess points appreciably in the rectum, so that it can be opened there. Intestinal obstruction frequently follows operations for pelvic appendicitis. Early operation is indicated and delay is fatal. A complicated fecal fistula may threaten life. In women, vaginal hysterectomy will save the majority of these patients.

Resection of the Stomach for Perforated Ulcer.—D. Eberle (*Schweizerische Medizinische Wochenschrift,* July 20, 1922) adds another successful case of gastrectomy to the fifty cases previously reported. The mortality in these cases is strikingly low, but nevertheless this operation is not as popular as it ought to be. Most surgeons consider this operation as indicated only in suitable cases—in the early stage of peritonitis when patient is in good condition and in the presence of simple topographical anatomical relationships. A more careful limitation for this operation would be to confine this operation to the cases in which the site of the perforation cannot be properly closed by suture. Extensive operative intervention must not be feared in these cases. The earlier the operation, the better the result, and the fate of the patient depends not so much upon the surgical technic as upon an early diagnosis by the physician.

Dyspepsia.—Horace W. Soper (*The Medical Clinics of North America,* July, 1922) applies the generic term dyspepsia to the group of symptoms produced by inhibiting agents, excluding gastric and duodenal ulcer, carcinoma and other new growths and also inflammatory processes and primary secretory disturbances. Clinically, the dyspepsia syndrome may be produced by a large number of etiologic factors, no matter what the cause. The diagnosis of dyspepsia is difficult and must be established by a process of exclusion and a very complete examination. The usual symptoms of dyspepsia are pressure, anorexia, distention, belching of gas, eructation of food, nausea, vomiting, or a capricious appetite. The various types of dyspepsia are the following: nervous, atonic, psychic, vagotonic, gallbladder, appendiceal and constipation dyspepsias. Organic disease in a nervous dyspeptic clouds the clinical picture.

Cascade Stomach.—J. H. Douglas Webster (*Lancet,* September 30, 1922) states that the subject of cascade or cup-and-spill stomach requires further observation before organic or spasmodic types can be definitely differentiated. It has been seen to occur in, 1, local ulcers or adhesions at the lesser curvature; 2, with pyloric and duodenal ulcers; 3, in normal stomachs; 4, with extreme meteorism, especially with distention of the splenic colon by gas; and 5, with extraventricular tumors.

Intestinal Antisepsis.—Lester R. Dragstedt, Carl A. Dragstedt, and Oliver M. Nisbet (*Journal of Laboratory and Clinical Medicine,* December, 1922) report that the direct application of antiseptic solutions to short segments of the intestine in animals does not effect sterilization or inhibit the production of intestinal poisons.

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The Immunological Classification of Common Hay Fever Plants and Trees

By WILLIAM SCHEPPEGRELL, A.M., M.D.,
New Orleans,
President American Hay Fever Prevention Association; Ex-President American Academy of Ophthalmology and Otolaryngology; Chief Surgeon of Hay Fever Clinic, Charity Hospital,

GENERAL CONSIDERATION.

In the classification of plants in their relation to hay fever, the first distinction, to which we first called attention in 1909 (1), is a general one, viz., 1, wind pollinated, and, 2, not wind pollinated. As the pollen of plants that are not wind pollinated, even if active, can cause a reaction only on direct inhalation, the former only need be considered in hay fever. Omitting the group comprising the grasses, we eliminate the large majority of plants and trees from etiological relation to hay fever.

While there are many wind pollinated plants, which, by reason of the negative reaction of the pollen or of their scarcity, are harmless in hay fever, the variety of plants that may cause hay fever is nevertheless exceedingly large (2). Of the wormwoods, for instance, the most common hay fever plants in the Pacific and Rocky Mountain States, there are about two hundred varieties of ragweed and as many of the marsh elders and cockleburs, while of the grasses, there are several thousand varieties.

If the application of pollen therapy required the use of the extract of the same pollen to which the patient is sensitive, it would clearly make this method impracticable, especially as most patients react to many different pollens. We have conducted a careful series of investigations with a view of segregating all the most common hay fever pollens into groups which should be morphologically alike, and the number of which should be as few as possible in order to simplify the question of pollen therapy.

OBJECT OF CLASSIFICATION.

As the special object of this classification of hay fever pollens is to simplify immunological methods, the segregation of different pollens need not be limited by botanical boundaries, but should depend upon biological tests and clinical data. We have already noted (3) that in cases of fall hay fever the earlier forms frequently develop, showing that sensitization to one group of pollens tends to lower the resistance to other groups of pollens. Conversely we have also found that immunization to one group of pollens raised the patient's resistance to the pollens of the remaining group, proving that nonspecific protein therapy, by stimulating the defensive powers of the organism, also cooperates in developing this form of immunity.

The lack of absolute specificity in the majority of hay fever cases is clearly demonstrated by the analysis of one thousand cases in our hay fever clinic and private practice. All but three and a half per cent. of these cases, that were found positive to the grass, chenopod or ragweed group, showed a well defined reaction to at least one other of the remaining major groups, even although not sufficiently marked to have caused hay fever.

BASIS OF CLASSIFICATION.

The most clearly defined classification is that of the grasses, the principal cause of vernal-estival hay fever. As several hundred species of these may be found in one district, and fifteen or twenty of them blooming at the same time, it would be a hopeless task to immunize a patient to each of the species that he might inhale. As the result of a prolonged series of tests, including over one hundred varieties of grass pollens, we have been enabled to determine that all the grasses have a similar hay fever reaction. This similarity differs in degree, but in no case have we found a subject sensitive to one of the grass pollen, who did not to a more or less extent react to other grass pollen with which he was tested. These tests were made by the intradermal method, as the uncertainty of the absorption by the cutaneous method makes the result less dependable.

SELECTION OF MEMBERS OF GROUPS.

While the grouping of hay fever pollens from a biological viewpoint has proved of great advan-

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tage in simplifying the diagnostic tests and treatment of hay fever, our experience has demonstrated that the most common member in the patient's vicinity of the group to which he reacts, should be selected for his immunization. If the tests with the timothy pollen extract, for instance, indicates that he is sensitive to the grasses, and the Johnson grass is the most common variety that reaches the pollinating stage in his neighborhood, this should be given the preference in his treatment.

When this is used, however, it will rarely be required to administer extracts of other members of the Gramineæ group, as the successful immunization with the Johnson grass pollen will protect the patient from the remaining grass pollens.

The same principle applies to the other groups. In many of the Eastern and Southern States, for instance, the giant ragweed is a more or less important factor in the autumnal hay fever, but our successful results in these cases have been derived from the administration of the common ragweed pollen extract only (4). For experimental purposes, we sometimes substitute the pollen extract of the giant ragweed in these cases, but without apparent charge in the effects of the treatment.

MAJOR GROUPS.

As the result of biological tests of over four hundred varieties of pollen, we have succeeded thus far in segregating the most important of these, both morphologically and botanically, into three major groups, as follows:

I. Ambrosiaceæ, or ragweed group. The principal cause of summer fall hay fever east of Kansas.

II. Artemisia or wormwood group. The principal cause of summer fall hay fever in the Pacific and Rocky Mountain States.

III. Gramineæ or grass group. The common cause of spring summer hay fever in the United States, Canada and Europe.

In addition to these, we have also segregated a list of minor groups which, while important in the aggregate, are individually less common, most of them being only of local interest. As a rule they demand attention more as complicating factors in patients subject to hay fever of the major groups than as individual causes of hay fever.

I. THE AMBROSIACEÆ OR RAGWEED GROUP.

The ragweed group is the most important in the United States, not only because the pollens of two members of the groups, the common ragweed and the giant ragweed, are the principal cause of fall hay fever in the States east of Kansas, but also because other members of this group are important factors in hay fever in most of the remaining States. This group is divided botanically, as well as morphologically, into the the following divisions (genera): 1, Ambrosia; 2, Gæmeria, and 3, Iva and Xanthium.

1. *Ambrosia, or Ragweed.*—This division contains about fifteen species, mostly native of America. The four following are of special importance in hay fever:

a. Ambrosia elatior, common ragweed (Fig. 1). This is the most ubiquitous and important of this division. It is an annual with spikes of green flowers (staminate) at the end of the branches, and pistillate or fertile flowers at the intersection of the branches with the stalks. It is a native of America and is found in dry soil from Nova Scotia to Florida and west to British Columbia and Mexico. It is comparatively rarer and local west of Kansas, and is there replaced by the western ragweed, the sandbur and the marsh elder, all of which also have abundant wind borne pollens. It has a spiculated pollen (Fig. 7), fifteen microns in diameter.

b. Ambrosia trifida, giant ragweed (Fig. 4). This replaces the common ragweed in moist soil in the Eastern, Middle and Southern States, and extends even as far west as Nebraska, Colorado and New Mexico. It frequently grows from ten to fifteen feet in height, permitting its pollen, which forms at the head, to be distributed over an extensive area. It blooms from August to October. The pollen resembles that of the common ragweed, both in appearance and reaction, but is larger (twenty microns).

c. Ambrosia psilostachya, western ragweed. This week is not as common in cities and towns as the common and giant ragweeds, have a preference for prairies and plains. It is, therefore, less important from a public health viewpoint, as it is less likely to reach the human nostrils. While not as abundant as the common and giant ragweeds, it has an extensive distribution, being found in moist open soil from Illinois and Wisconsin to the Saskatchewan, and westward and southwestward. It is a perennial, blooming from July to October. The pollen resembles that of the common ragweed, but is larger (twenty-five microns).

d. Ambrosia bidentata, lanceleaved ragweed. This is an annual found on prairies from Illinois to Missouri, Kansas, Louisiana and Texas. Like the western ragweed, it is uncommon in cities and towns. Its period of bloom is from July to September.

The four species of the Ambrosia division are almost synchronous in their pollinating season, which is from July to October, these limits varying somewhat according to the geographical location and weather conditions. Their pollens are all spiculated, and vary in size from fifteen to twenty-five microns. They give the same reaction to the lugol solution, which we use for staining our exposed atmospheric pollen plates. Based on several hundred tests, they all give similar reactions in subjects sensitive to any one of the pollens of this group.

Our general rule is to advise, for immunizing purposes, the member of the group that is most common in the locality of the patient. The great similarity of the reaction of these four species, however, is so marked, that we use the extracts from the common or giant ragweed for all cases of this group, especially as the western and lanceleaf ragweeds are infrequent near cities, and therefore less important factors in hay fever.

2. *Iva, Marsh Elder.*—These are herbaceous or shrubby, coarse plants with thick opposite leaves, and small nodding greenish white heads of flowers. There are about fifteen species in America, the five following being the more important factors in hay fever:

a. Iva axillaris, poverty weed. A perennial growing in saline or alkaline soil from Manitoba and

North Dakota to Western Nebraska, New Mexico, British Columbia and California. The pollen, spherical and twenty microns in diameter, is very abundant, and the plant is an important factor in localities where it is common. Its period of bloom is from May to September.

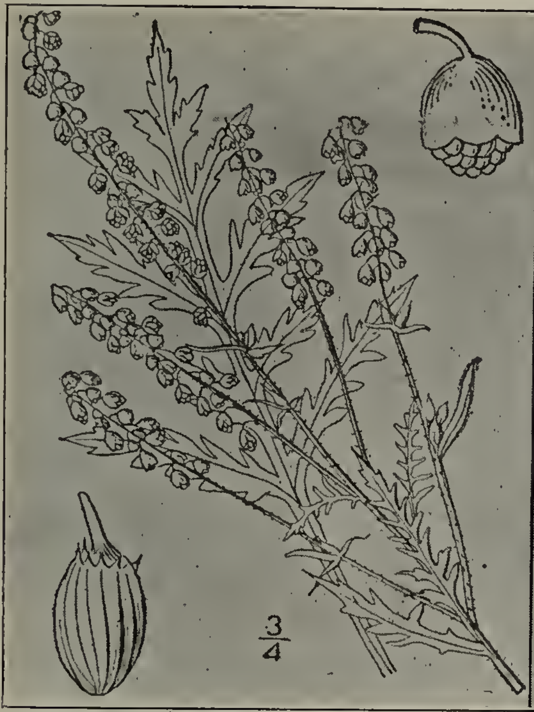
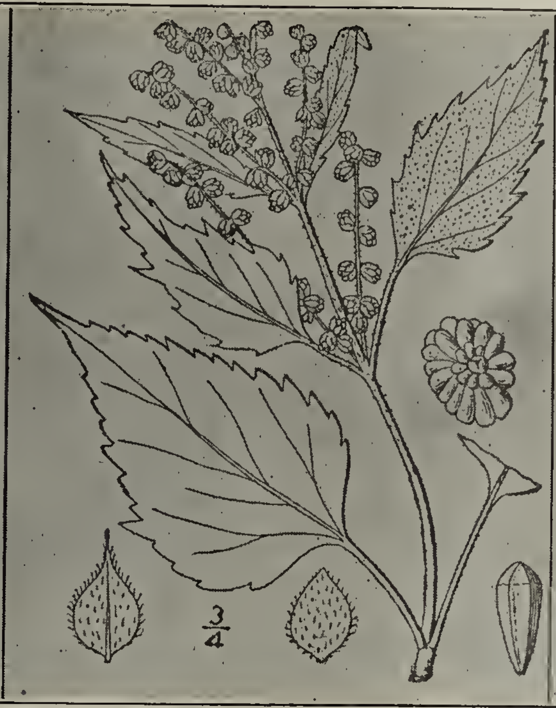


Fig. 1.



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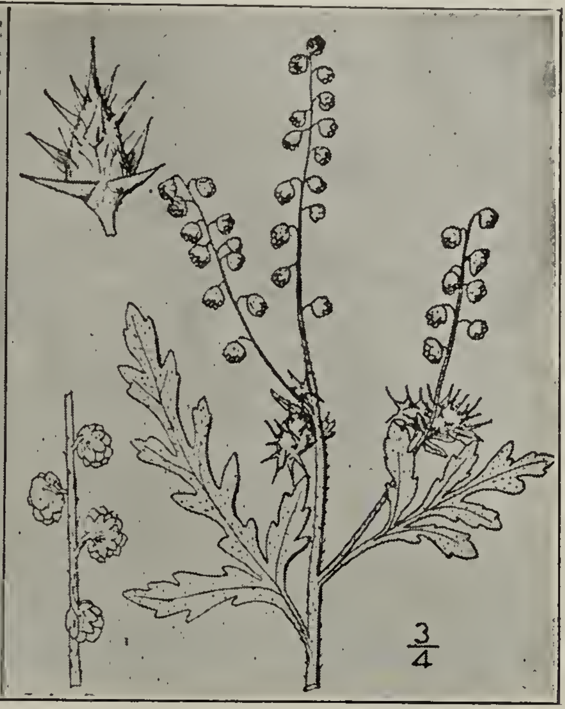


Fig. 3.

Fig. 1. Ambrosia elatior, common ragweed. Principal cause of autumnal hay fever west of Kansas.
Fig. 2. Iva xanthiifolia, great ragweed. Important member of the Ambrosiaceæ group west of Kansas.
Fig. 3. Gætneria acanthicarpa, false ragweed. Member of the Ambrosiaceæ group, common in some of the Western States.

b. Iva xanthifolia, burweed marsh elder (Fig. 2). This plant resembles the chenopods more than the ragweeds. It is an annual, growing in moist soil from Ontario to Wisconsin, Nebraska, New Mexico and Utah. It is sometimes found in waste places, but is most common near towns and cities. The pollen is ovoid, fifteen by twenty microns in diameter, and like all the other members of this group, is spiculated. It blooms from August to October.[1]

c. Iva ciliata, rough marsh elder. The abundant spiculated pollen, twenty-five microns in diameter, is distributed from August to November. It is an annual, growing in moist soil from Illinois to Nebraska, and south as far as Louisiana, Texas and Mexico. In some localities, as in the northeastern part of Louisiana, it is even more important in hay fever than the common and giant ragweeds.

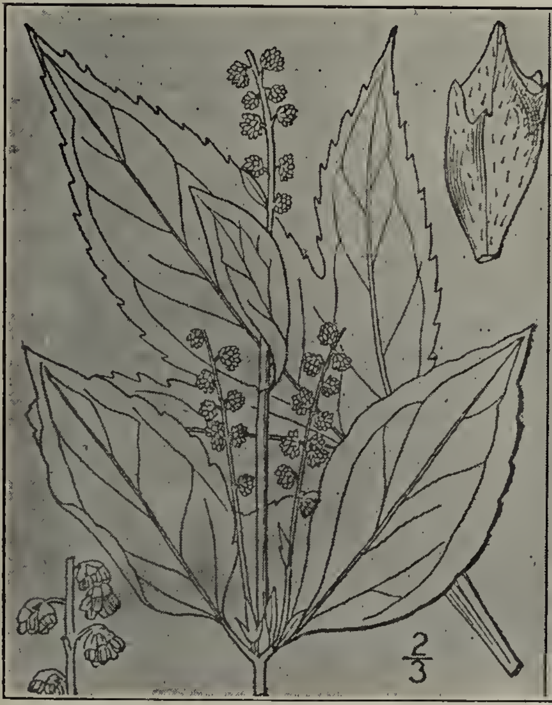
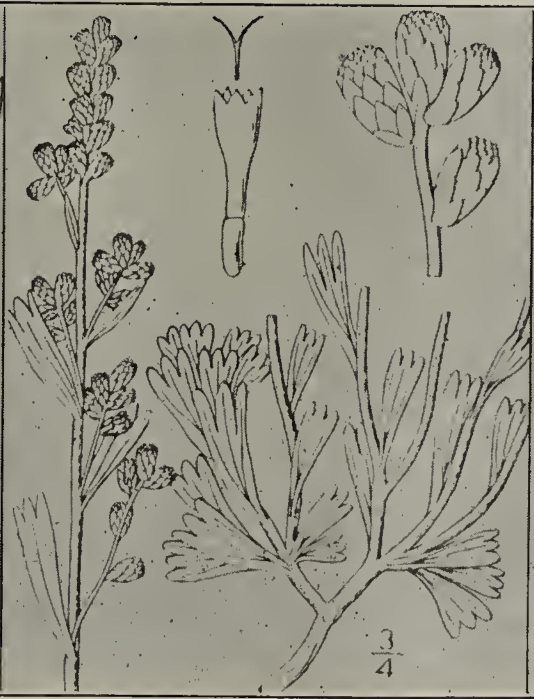


Fig. 4.



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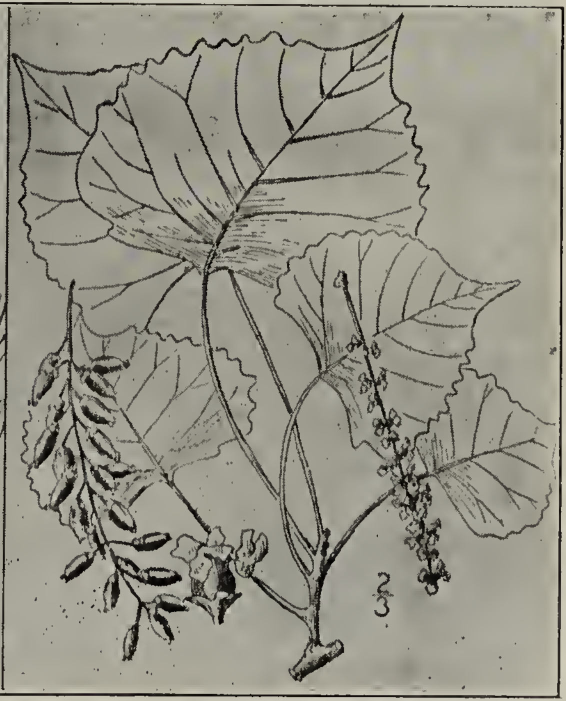

Fig. 6.

Fig. 4. Ambrosia trifida, giant ragweed. Important cause of autumnal hay fever in moist localities.
Fig. 5. Artemisia tridentata, sagebrush. The Artemisias form the principal cause of summer fall hay fever in the Pacific and Rocky Mountain States.
Fig. 6. Populus sargentii, cottonweed. Important local cause of early hay fever.

d. Iva frutescens, high water shrub. A perennial growing along salt marshes, and on muddy seashores, from Massachusetts to Florida and Texas, and blooming from July to September. On account of its habitat, it was formerly supposed to be a negligible member of this division, but we have found it to be a common cause of summer hay fever in subjects sensitive to the pollen of the ragweed group, when traveling on trains passing along marches and near the seashores where this weed is found.

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[1] The line drawings of plants are from the work of Britton & Brown, *Illustrated Flora of the United States, Canada and the British Possessions.* (The photomicrographs are original.

3. *Gætneria or Franseria.*—Herbs or shrubs with the general appearance of the ragweeds, blooming in late summer and autumn. There are about twenty-five species, natives of America, the following being the more important in hay fever: Gætneria tenuifolia and Gætneria bipinnatifida.

With the exception of Gætneria tenuifolia, which extends eastward as far as Kansas, they are uncommon in the Eastern States, but are important factors in hay fever in many parts of the Pacific and Rocky Mountain States. The Gætneria acanthicarpa, or false ragweed (Fig. 3), is one of the most common weeds in New Mexico, and its pollen is a fruitful source of hay fever in that State.

4. *Xanthium, cocklebur.*—Coarse annuals, with fifteen species of wide geographical distribution, the most important in hay fever being the following:

a. Xanthium spinosum. Spiny or thorny cocklebur or clotbur. It is found in waste ground from Maine to Ontario, Florida, Illinois, West Virginia, Missouri, Texas, New Mexico and California. It blooms from August to November. This was originally naturalized from Europe or Asia, but, on account of its predilection for waste ground near cities and its wide geographical distribution, has become the most serious menace to hay fever of the Xanthium division of the Ambrosiaceæ group.

b. Xanthium americanum. American cocklebur or burweed. This blooms from June to November, and is found in moist soil from Ontario to Florida, Michigan, Tennessee and Kansas.

c. Xanthium canadense, Canadian clotbur. It blooms from August to October, and is found in moist soil from Quebec to Minnesota, New York, Missouri and Colorado.

While the species of the subdivisions of the Ambrosiaceæ groups bear a close resemblance in their biological reactions to one another, the subdivisions themselves are not so closely related. For immunizing purposes, however, while selecting the member of the group that is the most common in the patient's vicinity, we have rarely found it necessary to protect the patient against other members of the group after immunizing him against the dominant species.

II. THE ARTEMISIA OR WORMWOOD GROUP.

The Artemisias or wormwoods, by reason of their wide distribution, numerous species, ability to thrive under conditions unsuited to the majority of other plants, and the lightness and activity of their pollen, form the most important hay fever group of the Pacific and Rocky Mountain States. They are herbs or shrubby plants, bitter and aromatic, with small nodding heads in panicled spikes or racemes. Their pollens are trilobed (Fig. 8), and are stained brown by the lugol solution. There are about sixty-five species found in the western part of North America, twenty-five of which are fairly common, and most of them blooming between July and October. The more important species in hay fever are the following:

1. *Artemisia heterophylla or vulgaris, California mugwort.*—It is the most common cause of fall hay fever in California, and in other sections where it is abundant. It is found from California to British Columbia to Nevada, and more scattered as far east as Pennsylvania. It blooms from July to October.

2. *Artemisia tridentata, sagebrush.*—(Fig. 5). This is one of the most abundant shrubs from Western Nebraska to Colorado, Utah and California and north of Montana and British Columbia. The pollen is produced from August to November.

3. *Artemisia frigida, pasture sagebrush.*—A perennial blooming from July to October, and growing on dry plains and in rocky soil from Minnesota to Saskatchewan, Idaho, Nebraska, Texas and Arizona. It is found at levels as high as 5,000 feet, and is one of the few plants which may cause hay fever at such high altitudes.

III. THE GRAMINEÆ OR GRASS GROUP.

The grasses are responsible for the spring summer form of hay fever commonly called rose cold. Unlike the Ambrosiaceæ and Artemisia groups, which are confined to certain sections of the United States, the grasses are general in their geographical distribution, growing in all kinds of soil, and even in water. While hay fever due to ragweeds and wormweeds is unknown in Europe, hay fever from the grasses is of common occurrence.

The grasses form a large and important botanical group, and include those yielding food grains called cereals. There are about 4,500 species, widely distributed throughout the world. They should be distinguished from the allied rush (Juncaceæ) and sedge (Cyperaceæ) families, which by reason of the density of the outer coat (extine) of their pollen, are harmless in hay fever.

The number of hay fever cases due to the grasses is less than that caused by the ragweeds. The reason for this is that the pollen of the grasses (Fig. 9) are much less buoyant than those of the ragweeds, the former measuring from forty to fifty microns in diameter, while the common ragweed pollen is only fifteen microns, its potential area being still further increased by its spicules, which increase its buoyancy. In the case of the cereals, the pollens are especially large as, for instance, corn eighty microns, wheat fifty microns, and rye forty-five microns, so that they are responsible for hay fever only within limited areas.

While the similarity of the biological reaction of the grass pollens simplifies the diagnostic test and immunizing treatment, the extract to be used should preferably be prepared from the pollen that is most common in the patient's locality. This will usually give the most decided reaction in the test, and the best results in the treatment. The use of other grass pollen extracts will not be needed, however, inasmuch as the successful immunization with the extract of the principal grass pollen will protect the patient against the effects of other pollens of this group.

MINOR GROUPS.

While the pollens of the three major groups are responsible for the greater number of hay fever cases, the pollens of the minor groups cause a certain percentage of cases either directly, or more commonly, as secondary or complicating causes. To give a botanical list of all wind pollinated plants would simply complicate the subject, especially as a large proportion of these are not found within their potential area of municipalities, or in such small numbers that their pollens are negligible in hay fever.

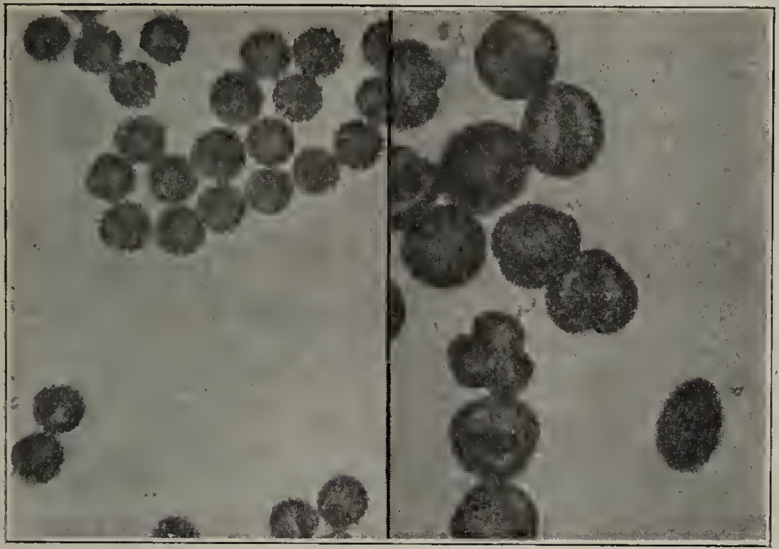

Fig. 7. Fig. 8.

Fig. 7. Pollen of common ragweed. Ambrosia elator.

Fig. 8. Pollen of California mugwort. Artemisia heterophylla.

The principal minor groups to be considered in hay fever are the following:

I. Chenopodiaceæ, goosefoot family.
II. Rumex, buckweed family.
III. Amaranthaceæ, amaranth family.
IV. Plantanaceæ, plantain family.
V. Trees.

In the segregation of these groups of hay fever pollens, the object is to simplify the subject so as to encourage and simplify immunological methods. Naturally there are plants in special localities which are not included in these groups; these are relatively few, however, but should not be overlooked by the earnest student of immunology .

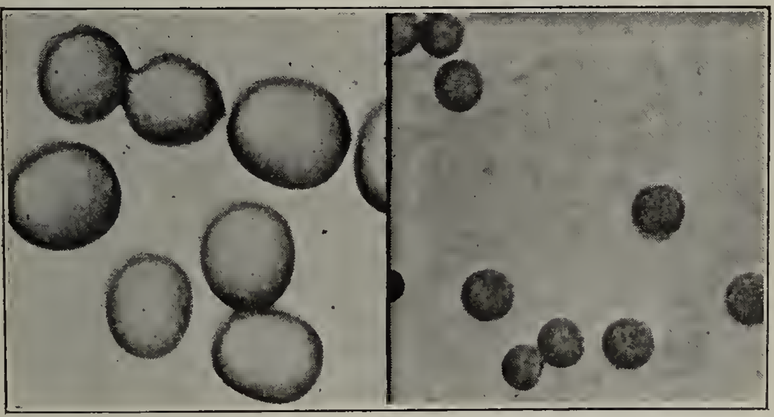

Fig. 9. Fig. 10.

Fig. 9. Pollen of Johnson grass. Andropogon helapense. Type of the pollen of the Gramineæ group.

Fig. 10. Pollen of careless weed. Amaranthus spinosus. Type of the pollen of the minor groups.

I. CHENOPODIACEÆ, OR GOOSEFOOT FAMILY.

This is a numerous family, with about seventy-five genera, fourteen of which are fairly common in the United States. There are altogether about 550 species, not more than forty of which are common. Most of them are weeds (several called pigweed), being common in cultivated or waste ground, and having a wide geographical distribution. The most important species in relation to hay fever are the following:

1. *Chenopodium album.*—Lamb's quarters, white goosefoot or pigweed. This is an annual naturalized from Europe, but now a common weed throughout North America, except in the extreme North. It blooms from June to September.

2. *Chenopodium ambrosioides.* Mexican tea or wormseed.—An annual (perennial in the Southern States) naturalized from tropical America, but now found in waste places from Maine and Ontario to Florida, and west across the continent to California. The pollen is extremely active on a sensitive subject. The period of bloom is from August to October, and the pollen may therefore be a complicated factor in the fall hay fever.

3. *Atriplex hastata or patula.*—Halberd leaved orache. It is found in salt meadows and waste places, most abundant near the coast, from Nova Scotia to South Carolina, Ohio and Missouri, and in saline soil from Manitoba to British Columbia, Nebraska and Utah, and on the Pacific Coast. It blooms from August to October.

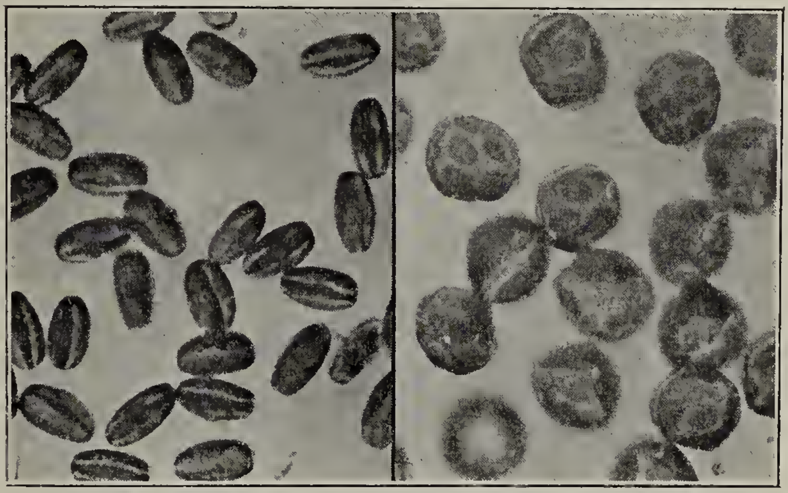

Fig. 11. Fig. 12.

Fig. 11. Pollen of water oak. Quercus nigra. Characteristic tree pollen.

Fig. 12. Pollen of black walnut. Juglans nigra. Local cause of early hay fever.

4. *Atriplex canescens.*—Bushy atriplex or sagebrush. It grows in dry or saline soil from South Dakota to Kansas, Texas, New Mexico and Mexico, and west to Oregon and California. Its period of bloom is from July to September.

5. *Sarcobatus vermiculatus.*—Greasewood. It grows in dry alkaline and saline soil, from Saskatchewan, south to California and Texas, and blooms in June and July.

II. RUMEX, THE DOCKS AND SORRELS.

These belong to the Polygonaceæ or buckweed family. A large widely scattered genus of perennial or annual leafy stemmed herbs, with about 140 species of wide geographical distribution, seventeen of which are fairly common in the United States. The most important in hay fever are the following:

1. *Rumex acetocella.*—Sheep sorrel, or sour dock. A low weed, common in dry fields and on

hillsides throughout North America except the extreme north. It is found at altitudes of six thousand feet in North Carolina. It blooms from May to September.

2. *Rumex crispus.*—Curly or narrow dock. A dark green perennial, but now a common weed in fields and waste places throughout nearly the whole of the United States and Southern British America. It blooms from June to August.

III. AMARANTHACEÆ OR AMARANTH FAMILY.

With the exception of some exotic genera, these are coarse annual weeds, with about forty genera, five of which are fairly common in the United States, and 475 species, about twenty of which are of common occurrence. They are widely distributed, and most abundant in warm regions. Some of the species, such as prince's feathers, love lies bleeding and coxcombs, are common in gardens for their conspicuous flowers. The most important in hay fever are the following:

1. *Amaranthus spinosus.*—Spiny amaranth or careless weed. A smooth, bushy branched annual, naturalized from tropical America. It grows in waste ground generally, and is common on empty grounds that has been cultivated. It blooms from April to December. The pollen (Fig. 10) is unspiculated, and measures twenty microns in diameter.

2. *Amaranthus retroflexus.*—Red root, rough pigweed. A roughish light green weed found in cultivated and waste soil throughout North America as far north as Nova Scotia, North Dakota and Washington. While only a complicating factor in hay fever in most sections, it is considered of prime importance in Arizona and the Southwest by Watson and Kibbler (5). It blooms from August to October.

3. *Acnida tamarascina.*—Western water hemp. A tall, erect annual found in swamps and moist soil from Illinois to South Dakota, Texas and West Mexico. It blooms from July to September.

IV. PLANTANACEÆ OR PLANTAIN FAMILY.

Short stemmed annual or perennial herbs, with three genera and over 225 species, of wide geographical distribution, fifteen species being fairly common in the United States. The most important in hay fever are the following:

1. *Plantago major.*—Common plantain, or henbane. A perennial common in waste places and near dwellings, almost throughout North America. It blooms from May to September.

2. *Plantago lanceolata.*—English plantain or ribwort. A hairy perennial, known by over twenty different common names in various parts of the United States, indicating its wide distribution, which is from New Brunswick to the Northwest Territory, British Columbia, Florida and Kansas. It blooms from April to November.

V. TREES.

Many of the trees are wind pollinated, and many form a cause of hay fever. The season of bloom of most of these is in the spring, so that they may form a local cause of early hay fever, or a complicating factor in the hay fever due to the grasses. Individually the season of bloom is limited to two or three weeks, and they rarely cause marked attacks, except when they grow near the residence of the patient.

While the tree pollens have been segregated in one of the minor groups, and we have found that any species of the various genera may be used to immunize against the other members of the same genus, we have not been able to select any pollen which is biologically representative of the entire group. If it is necessary, therefore, to immunize a patient against a tree pollen, the extract of a pollen of the same genus should be used for this purpose.

HAY FEVER TREES.

The trees, whose pollen may cause hay fever, are principally of the following:

1. *Quercus.*—Oaks. There are about 220 species, natives in the northern hemisphere, twenty-five of which are fairly common in the United States. Their season of bloom (Fig. 11) is from April to June.

2. *Populus.*—Poplars and cottonwoods (Fig. 6). There are about thirty species, natives of the northern hemisphere, eleven of which are fairly common in the United States. They bloom in April and May.

3. *Fraximus.*—Ashes. There are about fifty species, mostly of the north temperate zone, ten of which are fairly common in the United States. They bloom from April to June.

4. *Juniperus.*—Junipers and cedars. Evergreen trees or shrubs, with about forty species, fifteen of which are found in the United States. The blooming season of most of these is in April and May. Some species bloom much earlier, however, as, for instance, the mountain cedar, which blooms in February, and is a local cause of early hay fever in Central Texas.

5. *Juglandaceæ.*—Walnut family. This is a small family of valuable trees, the most important genera being the following:

a. Juglans, walnut. Trees with spreading branches, fragrant bark, and odd pinnate leaves. There are about eight species, natives of the north temperate zone, five of which are fairly common. They (Fig. 12) bloom during the months of April and May.

b. Hicoria, hickory. These are fine trees, with hard and tough wood. There are about twelve species fairly common in the United States, and they include the pecan, shagbark, and pignut. Their period of bloom is from March to May, occasionally to June.

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Maison Blanche Annex.

Bronchial Asthma and Hay Fever with Special Reference to the Treatment of Nonspecific Cases*

By MAXIMILIAN A. RAMIREZ, M.D.,
New York.

So much has been written on the theory of protein sensitization, and on anaphylaxis and allergy in general, that I shall not take up space with a didactic discussion of these problems, which are undoubtedly familiar to all.

ASTHMA.

There are a great many types and degrees of asthma, but using the test reaction to proteins as a means of segregating or classifying cases, we may divide asthma into two groups: those giving a positive reaction to proteins which may be called specific asthmas, true bronchial asthmas, protein asthmas, or allergic asthmas, and those that do not react to proteins. In this large group, which forms about sixty per cent. of all cases, we have a type which I shall report for the first time as nonspecific asthma. These cases are true asthmas, and are due to interreaction between antigen and attached cellular antibodies; but the attached cellular antibodies are not specific, they are nonspecific and as yet unclassified immunologically, and this group does not give positive skin tests.

The acceptance of this theory will explain satisfactorily all those cases of asthma in which the patient has typical attacks and is absolutely free of symptoms between attacks. Seizures come on at regular intervals and without apparent cause, and after testing, it is impossible to find a positive etiology. In this group I should like to include cases due to protein split products, to the end products of protein digestion, chiefly among which is histamine. I shall take up this group a little later.

In further classifying cases that do not react to proteins, and which we are not including under the head of nonspecific asthma, we have the truly nonprotein or nonallergic, or atypical asthmas. In this group there are present, practically always, chronic bronchitis, decided peribronchial thickening, enlarged bronchial lymph glands, and fibrous tissue infiltration around the finer bronchi. This is also the group associated with chronic sinusitis, nasal polypi, infected tonsils, etc. Under this head we are obliged to include those cases of chronic bronchitis with asthmaticlike attacks, where the symptoms are due to plugging of the bronchi by fibrous or mucous plugs, excessive secretions, or possibly caused in part by sensitization to the protein in the bodies of the bacteria, resulting in either specific or nonspecific bacterial protein sensitivity.

In studying cases of bronchial asthma it is essential to obtain a careful history and perform a complete physical and laboratory examination. In the history, we should go carefully into the age of onset of the symptoms, for the earlier in life, the greater the incidence of true allergic asthma. The time of year at onset is important, whether or not the patient was free of symptoms between attacks, and whether the attack followed an acute respiratory infection. The family history is important, as true allergic cases seem to have a definite hereditary trend. Do not fail to go carefully into the condition of the nose, throat and sinuses, the digestion, regularity of intestinal action, and symptoms referable to endocrine dysfunction. Also, do not fail to eliminate cardiac and renal disease, hypertension, and chronic pulmonary tuberculosis.

In addition to a careful history and physical examination, one should get an x ray of the chest, a urine, stool and sputum examination, and if there is any indication for it, an x ray of the sinuses, and a culture from the nose and tonsils. The sputum should be examined, not only for tubercle bacilli, as is so often the custom, but also for predominating organisms.

A complete protein test should be performed in all cases of asthma, for though only about twenty per cent. of a large series of cases will give positive reactions, and the remaining eighty per cent. are negative, this is the only way to classify cases.

True or typical allergic asthma will give a positive skin reaction to the particular protein, or group of proteins, to which the patient is sensitive. It may be a food, animal emanation, or pollen, or a combination of these. Skin tests against bacterial proteins do not give satisfactory results; they do not seem to check up with the clinical course of the individual cases.

The most satisfactory results are in the cases reacting to the animal emanations and pollens, and the most common type o freaction is to horse dandruff, though goose feathers and rabbit hair are quite frequently seen. Rabbit hair, as is well known, is used very commonly in upholstered chairs.

Of the pollens, timothy, ragweed and corn are the most common offenders, though, of course, any hay fever pollen may cause asthma, as also with epidermals, any animal dust, such as dog or cat hair or chicken feathers may be the cause.

Of the foods, wheat, milk and egg white are the most important, and also the most difficult to eliminate completely from the diet. Active immunization against the pollens and epidermals is quite satisfactory, but against the foods it is unsatisfactory, and it is best, when possible, just to eliminate the offending food from the patient's diet.

In long standing cases there is usually an associated bronchitis, with peribronchial thickening and increased fibrous tissue formation around the finer bronchi. And this condition has to be contended with, as it is responsible for the continuation of symptoms, even after the true offending protein has been discovered and successfully eliminated. The management of this complication is similar to the treatment of nonspecific asthma, therefore I shall take it up in detail under that head.

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*Read at St. Francis Hospital, Poughkeepsie, N. Y.

TREATMENT OF NONSPECIFIC CASES.

In the management of the nonspecific cases it is necessary to have an x ray of the lungs and sinuses, a sputum examination, and a complete stool examination. The stool should be examined for reaction, albumin putrefaction, carbohydrate fermentation and the character of the bacterial flora. If there is any evidence of sinusitis, this must be treated; if the tonsils are infected they should be removed, or treated locally. All foci of infection and absorption should be carefully eliminated.

Deep breathing exercises, in order to stretch the finer bronchi, and loosen adhesions and fibrous plugs, are very essential and should be insisted upon. The patients should be instructed to use the double blow bottles, or it may be more soothing and more pleasing to them to inhale several times a day the vapor of some soothing, oily mixture from a nebulizer.

Intravenous injections of sodium iodide give decided relief. They loosen the cough and make expectoration easier. Several injections should be given at daily intervals and then continued once or twice a week. Diathermic treatment of the chest gives some relief, making breathing and expectoration easier.

One of the best palliative measures at our command is diathermy. The treatment is given for one half to one hour, two or three times a week. Hypodermic injections of a specially prepared peptone solution give satisfactory results in obtaining more or less permanent relief. I have been using a ten per cent. solution, injecting one half c. c. daily for a week, and then increasing to one c. c. In the true nonspecific cases there is often an aggravation of the symptoms after an injection of peptone in which case it is best to diminish the dose, repeating the dose daily, however. Regulation of the diet and the ordinary mode of living is, of course, beneficial. Patients should be instructed to eat frequently and to take small quantities at a time, being careful never to overload the stomach. The main meal should be taken at noon and only a very light evening meal. Patients should be instructed to rest for half an hour to an hour after each meal, and if there is the slightest tendency to abdominal distention or gastric distress, a hot water bag or an electric pad on the abdomen during this rest period is helpful.

The stool examination will be a great aid and guide in regulating the diet. If there is much albumin putrefaction naturally it will be advisable to cut down the protein intake, and limit eggs, milk, etc. If, on the other hand, there is a great deal of carbohydrate fermentation, the starches and sugars should be eliminated from the diet. Colonic irrigations once a week seem to be beneficial in all these cases; they are definitely indicated in cases presenting symptoms or laboratory evidence of intestinal dysfunction. In cases of marked albumin putrefaction, where the bacterial flora shows an excess of colon bacilli, the administration of the bacillus acidophilus is indicated and often beneficial. Elimination should always be stimulated and it is well to advise a mild cathartic daily, such as sodium phosphate in a glass of hot water every morning. This, of course, depends on the needs of the individual patient.

We are at present experimenting with injections of histamine in an attempt to immunize actively against this protein end product in the cases where we suspect it as being an important factor. Though the improvement in the symptoms in a few of our cases has been most encouraging, I do not feel prepared to make any very definite statement regarding this form of therapy at present.

Autogenous vaccines prepared from the patient's sputum often give good results; this is particularly so in the true, nonallergic, or in the true bacterial cases. I firmly believe that better results are obtained by the use of small doses of the vaccines.

HAY FEVER.

I shall now say a few words about hay fever. Most of the cases of hay fever, or socalled vasomotor rhinitis, or pollinosis, or allergic vasomotor rhinitis, are due to sensitization to one or more of the pollens. I do believe, however, that here, as in asthma, we also have a group of cases due to a nonspecific sensitization where the patients present typical symptoms of seasonal vasomotor rhinitis, and still, on testing, do not react to any of the pollens which we ordinarily use in our tests. In these cases, as in asthma, I have obtained a definite relief of symptoms by the use of daily injections of peptone intramuscularly. There are undoubtedly cases of vasomotor rhinitis caused by proteins other than pollens, but these cases are not common. Definite nasal defects should naturally be corrected in the treatment of all cases of hay fever, but I am absolutely opposed to the removal of turbinates unless they are very definitely and extensively diseased, as I am opposd to advising hurriedly submucous resections in these cases, as the relief from symptoms is usually very shortlived. Cauterization of the turbinates and sensitive points on the septum is not a particularly appealing procedure. It is evident that measures designed to lessen local tissue irritability are very desirable, as many spasms are initiated in susceptible cases by dust, cold air, or irritating vapors.

In actively immunizing against the various pollens I believe that many of the failures are due simply to insufficient immunization, and I feel that treatment should be started at least three months before the date of the expected attack and continued right through the particular pollen season.

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47 WEST FIFTY-FOURTH STREET.

Bronchial Asthma Due to Mice

By WILLIAM LINTZ, M.D.,
Brooklyn, N. Y.,
Clinical Professor of Medicine, Long Island College Hospital; Physician in Chief, Bikur Cholim Hospital.

The emanations from all sorts of animals have been known to cause attacks of bronchial asthma; but there is no case on record where the emanations from rats and mice have been the cause of such an attack. It is important to bear this fact in mind when one searches for the etiology in obscure cases of asthma. The more we know of the different agents which may cause asthma, the greater will be our percentage of positive cutaneous tests, and after elimination or desensitization of the allergic agent, a greater percentage of cures will be obtained. In the following case a mouse caused attacks of bronchial asthma.

Case I.—I. J., female, thirty-six years of age, had been suffering for the past seven years from attacks of bronchial asthma, characterized by choking, wheezing, severe cough, and expectoration. There was no aura. The attacks, which were very severe, occurred four or five times a month and lasted three to five days, sometimes one or two weeks. There were no predisposing factors. The attacks occurred mainly at night, only occasionally in the daytime, and chiefly from December to March. Otherwise the patient felt well.

Seven years ago the patient was in the mountains during the summer and felt very well. She was at Rockaway Beach last summer and had no attacks. During the winter months she was at Atlantic City and felt well. If she stayed at her mother's house, a few blocks from her home, she was free from asthma. She felt better when sitting and resting, but if she lay down in her bed, she was likely to have an attack. Neither food nor weather seemed to bear any relation to the attacks, nor did the emanations from the cat, horse, or dog. She had a persistent cough during the attack, accompanied by a moderate amount of thick yellow phlegm but no odor. Expectoration relieved the attack. She suffered from marked wheezing—could not get air out of her lungs—was short of breath on the slightest exertion, even while talking or eating.

There was no nausea or vomiting but she continually belched gas, suffered from heartburn, and days of constipation alternated with diarrhea and mucus stools, which she believed was due to food.

Numerous attacks of tachycardia and palpitation bothered the patient very much, and she had flushes, chills and swelling of the feet. She suffered from nocturia and polyuria, but the genitourinary symptoms were otherwise negative. The skin presented red blotches and there was intense itching during the attack. The patient was nervous, irritable and suffered from insomnia and dull frontal headache. Her nose was always occluded, eyes and nose running, and she sneezed a great deal, especially from November to April. Menstruation had no relation to attacks; no change in periods, which were normal.

She was perfectly well between the attacks. She always belched, however, and was subject to attacks of diarrhea, coryza, running eyes, sneezing, and nocturia, even between attacks.

Menstruation began at thirteen, had always been regular, occured every twenty-eight days, lasted six or seven days, was moderate in amount, and accompanied by cramps and clots. She did her own housework, had a good appetite and was gaining in weight. Her mother had goitre, her husband and two children had eczema. There was no history of asthma. She had had measles and typhoid fever when she was young and influenza two years ago.

Examination showed that her hair was falling out. There was little hair at the outer third of the eyebrows, and hypertrichosis of upper lip and chin. Her eyes were brown, pupils contracted, and reacted to light and accommodation; conjunctivitis was present. There was no nasal obstruction. Teeth were everted, right lateral incisor notched and peg shaped; bridge and gold work present. There was also pyorrhea. Tonsils, uvula, and fauces were red and inflamed. The thyroid glands were diffusely enlarged; no bruit was heard. The cervical glands were not enlarged; mammary gland was hypertrophied. The heart was negative. There was wheezing and the lungs showed dry sonorous râles throughout. A mole and secondary adrenals were present. An examination of the abdomen showed no tumor, no masses; liver, gallbladder and spleen were negative. The extremities were edematous. Reflexes were normal. The diagnosis was bronchial asthma with hyperthyroidism.

That the case was one of bronchial asthma there was no doubt. The history was typical and the findings on physical examination were those which are so characteristic of this disease. While it was easy to establish the diagnosis, it was exceedingly difficult to establish the cause. All laboratory examination, all cutaneous allergic tests proved negative. For a time the patient continued to have her attacks and the best I could do was to relieve her with injections of one c. c. of one in one thousand solution of adrenalin. No matter what I did I could not establish the cause of the asthma.

That the cause was within the premises of her house I was sure. Was she not free from asthma the moment she landed and stayed at her mother's house, only a few blocks away? One day while examining the patient's premises, I was struck by the number of mousetraps scattered throughout the house and store. The patient lived over her husband's drug store. Upon inquiry I was informed that the place was infested with mice and rats. Then it dawned upon me that her asthma must be due to these rodents for the following reasons.

1. The attacks of asthma occurred during the period from December to March, when these rodents leave the fields and enter the house for food and warmth.

2. They occurred usually at night, when the rodents prowl about.

3. When she stayed at her mother's home, a place free from rodents, and only a few blocks away, she

was free from the attacks. When she returned to her own home, a place infested with rodents, the attacks occurred.

4. If she lay down in her bedroom, she had an attack.

5. By exclusion, all other investigations were negative. All the cutaneous tests were negative.

I therefore resolved to determine whether I could bring on an attack of asthma by exposing her to a mouse. When she was perfectly free from asthma, having just returned from her mother's home, without the patient's knowledge, in order to exclude all psychic influence, I placed a little white mouse in a box covered with gauze and asked her to smell the box. The patient said she smelled nothing and put the box on the table. In three minutes time she exhibited a very severe and typical picture of asthma. Not only did she have the marked choking, wheezing, dyspnea and cough, but also marked dermatitis broke out over all the exposed parts of her body, which itched intensely.

A very energetic extermination of the rodents was then undertaken and after the removal of a few dead rats beneath the boards of her bedroom floor, the patient was free for three years from attacks of bronchial asthma. She then moved into a fine neighborhood facing a public park. When spring came, she had her first attack of asthma in the spring time. This lasted all summer. Cutaneous tests made at this time proved that she was very strongly positive to ragweed short, a little less to ragweed tall and sweet potatoes, and less to chicken feathers, timothy and whole egg. Under proper immunization she became free from asthma.

This case proves that some of these stubborn cases of bronchial asthma in reality become pieces of research work. In some of these difficult cases, it is really necessary to familiarize oneself with the patient's environment and conditions under which he works before the true solution of the problem can be found. A striking instance of this last statement is shown in the following case: A nine year old child was brought to me suffering from severe attacks of bronchial asthma. Cutaneous tests revealed that she was strongly sensitive to lettuce, spinach, potatoes, peas and ragweed. In spite of the elimination of the above mentioned articles from her diet and the proper desensitization, she still continued to suffer from attacks of asthma. It was only after visiting their summer place and knowing that the pampas grass grew there very abundantly, that I was able to establish the fact that she was most markedly sensitive to this pampas grass. However, after returning to their permanent home the child continued to have attacks of asthma. The fact that the mother had decorated her home with the pampas grass which was then disseminating its pollen enabled me to establish a complete cure in this particular case.

1352 Carroll Street.

Psychology of Hay Fever

By J. PAUL DE RIVER,
San Francisco.

Psychology and modern medicine are inseparable and interwoven. Success in practice depends not only upon one's medical knowledge, but also upon the use of applied psychology. Keen attention to the temperament and actions of every patient frequently enables one to differentiate the stable brain from the psychoneurotic or imaginative genius. To do this one does not have to be a specialist in psychology, nor does he have to enter the class of charlatans and sympathetic healers. One's sense of judgment, together with an understanding of a few fundamentals of normal psychology, is all that is required. Imagination accompanies every ailment, no matter of what nature it may be. At times, however, the degree of imagination is in excess of reason and will power to control. In the struggle for supremacy which follows, will usually succumb to imagination.

It is then we meet the psychoneurotic. This particular class of patient is encountered by every physician. In ophthalmology and otolaryngology we have our share. They are not limited to any particular class, nor does sex seem to play any part. In the front ranks of this army of psychoneurotics stand the sufferers from hay fever. Hay fever in itself is a true vasomotor neurosis, and its sufferers are either primarily psychoneurotics or manifest a secondary psychosis following the hay fever attack. There is no condition that the ear, nose and throat specialist encounters in which the nervous element plays such a conspicuous part. In fact, nearly all states of functional insanity are at one time or another experienced by the sufferer, from the irritable and excitable states to the depression of melancholia. Fixed ideas and phobias are but a part of the syndrome.

The hypersensitive condition of the nasal mucosa leads to an overstimulation of the sneezing centre, resulting in this act becoming automatic. Without his will the patient sneezes, due to lack of inhibitory control.

Then comes the excess of imagination. He has ideas that in certain localities his condition is provoked. The mere thought or suggestion of his condition stimulates his sneezing centre (thought stimuli). These sufferers live in a state of obsession. Drafts, smoking, street cars and trains may all bring on an attack. This state of obsession continues in a more or less degree throughout the whole hay fever season, and in many the act of sneezing has become implanted in the subconscious to such an extent that the mere thought or mention of a trip on the train, or a visit to a special locality will bring on an attack. What are we to do for these patients? Assuming that the primary condition is hay fever, and acknowledging that it is in itself due to some disturbance in the vasomotor system, as a rule ingrafted upon a psychoneurotic diathesis. This leads one to ask, first, are we to treat the condition locally? Second, if local treatment is used alone, can we expect to gain results by ridding the patient of an element which is psychoneurotic? And third, shall we use a combination of both methods, viz., the treatment of a local condition furnishing symptomatic relief together with the intelligent use of psychotherapy? The last method I am indeed partial to, and we, as otolaryngologists, find it our duty to attack nasal pathology, correcting all deviations from the normal in order to restore the physiological functions as near as possible. The application of pollen antigens when indicated, local applications of medicinal substances, the surgical correction of all anatomical defects of the nose and throat, and the proper use of psychotherapeutic measures are indispensable adjuncts. Only by recognizing the psyche, which is the directing force, and realizing that the spirit, soul and body are inseparable are we able to treat the whole human being scientifically, with the hopes of gaining results.

Room 326 Veterans' Bureau.

Tonsillectomy.

Electric Coagulation and Desiccation

By A. M. MAC WHINNIE, M.D.,
Seattle, Wash.

Theories regarding the function of the faucial tonsils are many and varied and so far but one is accepted clinically. There is no dissension, clinically, from the belief that the tonsils furnish a secretion for the lubrication of the pharynx and act as a support to hold out the pillars in their advanced position in the pharynx. The ablation of the tonsil and its capsule obliterates this function completely or partially and the arch atrophies, as well as the palatoglossus and palatopharyngeus muscles. There is a widening of the faucial space and at the same time a loss of action of the soft palate, tongue, and larynx. It is only on account of these functions being compensated by other tissues that the voice retains some of its quality. Even so, the throat tires more quickly than under normal conditions and dryness is frequently complained of.

The prime object of the palatopharyngei muscles is that of controlling the pitch of the voice with the superior cornua of the thyroid cartilage serving to tilt the cartilage forward, thus tending to stretch the vocal cords. The characteristic resonance of the cavity is largely determined by the size, shape, and contents of its resonance chambers. It follows, then, that the lymphoid tissue in the nasopharynx, oropharynx, and larynx goes far in determining the characteristic resonance, thus giving to the voice its distinctive features. The voice can only be normal when this lymphoid tissue is normal; the degree of impairment depending upon the degree of enlargement of the tissues forming the contents of the chambers.

In reviewing the literature, one is impressed with the various opinions of the different men as to what is an infected tonsil. One can only conclude that no precise and definite standards have been accepted. One authority considers more or less congestion, with a spongy appearance produced by edema over the surface of the tonsil, as evidence of infection. Often patients with arthritis will state that they have never had tonsillitis or sore throat, yet on pressure the tonsil will disclose pus. Yet we find Makuen stating that a mere congestion of the pharynx, or even an occasional tonsillitis, is not sufficient reason for the removal of the tonsils, as the cause of the disturbance may be in some remote part of the body. Makuen's statement corresponds with my experience, for we well know that at the present time, with the short order meals, the unbalanced diet and poor nitrogenous elimination are responsible for the low resistance of the pharynx, making it amenable to infection.

The treatment of tonsillitis seems today to be based upon infection. Yet we know that if the chemical system of the individual is at par, such infection does not usually take place, except from traumatism. It is true, that many physicians are removing tonsils where the color of the throat is normal, the size of the tonsils seeming to be the only reason for their removal. The question resolves itself into what constitutes the cardinal indications for tonsil removal. There are no definite criteria for what constitutes the cardinal symptoms for finally determining the necessity for removing the tonsils; each individual physician uses his judgment. The various medical organizations should establish a standard, after a committee investigation, as to what should constitute the definite signs for tonsil removal. Probably this is asking too much. All textbooks, published after the report of this committee has been submitted, will make use of it and place the tonsil operation on a definite scientific basis. Pick up any of the textbooks and the reasons for tonsil removal vary from redness of the throat, enlargement of the tonsil, voice fatigue and anemia, to secretion from the tonsils. With such a variety of opinions, it is not to be wondered at that the tonsils are removed wholesale for each new ailment of the body. The clinical results, as shown by the reports of Simpson, Blauner, Orgel and Kaiser, showing the end results from one year to a year and a half after operation, give us a concrete idea upon which we can conscientiously base the final results of tonsil eradication, one year postoperative being a good time to make a just and honest comparison with the preoperative condition.

We know from these reports that tonsillectomy does not insure against further attacks of sore throat, infections, and other diseases for which the operation was done. The results reported by Girard College of operations for sore throat, mouth breathing, and impaired hearing, show an improvement in scholarship, voice, and health varying from fifty-eight per cent. to ninety-five per cent.; the ninety-five per cent. improvement being in the quality of the voice, which speaks well for the character of the surgery.

My method of determining whether the tonsil should be removed is as follows: first, ocular inspection; second, making a culture from the crypts of both tonsils, compressing the tonsil for the possible presence of pus in and around the tonsil, to find the predominating bacteria, usually streptococcus and staphylococcus of the various species and occasionally diphtheroid; third, chemical blood analysis, urea, uric acid, nonprotein nitrogen, creatinin, and blood sugar; fourth, Wassermann and Noguchi tests; fifth, blood pressure; sixth, x ray of the pituitary body, for we must not overlook the fact that the late Dr. Joseph Fraenkel repeatedly pointed out the functional connection between the glands in the cranium and the glands in the throat, and the hypophyseal tissue in the upper part of the pharynx from which part of the embryo the pituitary gland is subsequently developed. He considered that the tonsils, pituitary, and appendix were functionally related. His conviction was so strong in the utility of the tonsil and its protective influence on the appendix, that he refused to believe that a suppurative appendix existed in a patient where the tonsils were intact. According to him, only when the tonsils are destroyed by disease or removed by the surgeon is pus in evidence in the appendix. This is food for greater thought than we have at present time given to the tonsils.

When we have definitely established that the tonsils are the seat of the infection there is but one course to pursue—treatment of the blood chemistry and a complete eradication of the tonsils by some method that will leave the throat with as great or greater functioning power than existed previous to the operative procedure. The consensus of opinion is that the operative procedure of choice is one in which the tonsillar capsule, so called, shall be left intact and thereby retain as near as possible the complete functioning power of the palatoglossal and palatopharyngeal muscles. Following the sharp cutting operations, we have all been chagrined to see the various deformities amounting almost to distortion, rapid tiring of the voice following speaking, as well as of the individual physically, so that many speakers, who previously had been able to speak for an hour at a time, found themselves completely prostrated after fifteen minutes' speaking. Kenyon asserts that ninety-five per cent. of the patients who have been operated upon by the cutting method show a deformity of some kind. This must strike one as very strange, for of all operators upon the tonsils in this country surely more than five per cent. are first class. Many of us have dissected out most beautifully the tonsil and its complete capsule with apparently no injury to the palatoglossus and palatopharyngeus muscles or the superior constrictor, congratulating ourselves on the beautiful result, and then, at the end of say three months, are chagrined to see the fossa fill up level with the pillars, retarding their action. In the cases where this does not take place, a gradual thinning out, an atrophy of the palatoglossus and palatopharyngeus muscles, takes place with loss of functioning power in the voice from lack of capsule support.

One of the most annoying sensations following this, especially in adult patients, is the tiring of the throat which affects both phonation and articulation and the inability to protude the tongue as far as before the operation. These two muscles are highly developed in singers and professional voice users and they serve in a great measure to regulate the relative positions of the tongue and soft palate in voice production. They also indirectly affect the action of the laryngeal muscles by helping to control the palatal and lingual positions during the phonatory action of the vocal cords and other portions of the larynx. We even find many patients who have lost their voice control and been obliged to give up lucrative positions for others less remunerative. One writer states that he does not believe it is possible to remove the capsule intact, as it is of fibrous material and covered by the superior constrictor muscle, and the fulcrum upon which it acts being without scar tissue and adhesions, the superior constrictor muscle is held down, with the result that many patients complain of difficult deglutition.

In operative procedures upon the tonsil one must never lose sight of the accidents which may occur. The anomaly of the arteries in elderly patients; children in whom the thymus gland is still large; the possibility of hemorrhage in proportion to the clotting time of the blood and blood pressure; pulmonary abscess; anterior dislocation of the atlas; pain in the tonsil region, neck, and larynx, said by Justus Matthews to be due to the larger branches of the glossopharyngeal nerve being injured.

What shall be the operation of choice? One in which the loss of blood and shock is reduced to a minimum and in which the patient will be better off physically and the voice equal to or better than before the operation. No cutting operation that removes the entire capsule can give as good a result as one in which there is a complete removal of all the tonsillar tissue leaving the capsule intact. Those who have done thousands of these tonsil operations and witnessed a large amount of cicatricial contraction and palate deformity, are convinced that a method should be used for the enucleation of the tonsil with the smallest possible amount of traumatism and the least amount of capsule destruction that will give a satisfactory result, avoiding all the conditions mentioned above. If all the capsules, so-called, were of uniform thickness, we would be able, by careful dissection, to remove that portion of the capsule which is in intimate contact with the tonsillar tissue, and thereby obtain perfect results. But some of these are thin and some are thick, consisting of several layers of fibrous tissue which can be pared off like the layers of an onion. Age does not make any difference in the thickness of the capsule, generally speaking. It does add some thickness but is not consistent with the age of the patient. With the intimacy that exists between the capsule and the superior constrictor muscle and the dangers that attend cutting operations, a procedure that will eliminate all tonsillar tissue and leave the capsule intact to act as a supporting membrane to the superior constrictor, glossopharyngeal and palatopharyngeal muscles is the ideal method for eradication, with the highest possible physiologically functionating throat. Makuen states that he believes leaving the capsule intact is perfect surgery. No cutting operation that involves the removal of this capsule can insure the operator, as well as the patient, that he will have a throat which will function physiologically.

In removing the tonsils, we find that there is pus formation in or around the tonsils, with the result that a certain amount of absorption of pus into the system takes place, evident for a week or ten days, sometimes longer. Any procedure that will eliminate this it seems to me, is ideally perfect. We must never forget that we are operating up into the cervical region and it has happened that serious infection has resulted from opening this area. In reading over operative procedures, we find numerous instances where most operators make an anterior and posterior incision cutting through into the intrapharyngeal aponeurosis, thus taking away one of the supports of the anterior and posterior pillars.

It may seem presumptuous on my part to offer a new method for tonsil eradication, leaving the capsule intact, when there have been so many tonsil operations recommended, but only after six years' use is it offered.

With electrodesiccation or thermocoagulation all the difficulties enumerated can be avoided. One must remember that the equipment should not consist of a box such as that sold by some manufacturers. One must have a machine of ample power with a hot wire milliamperemeter so that the current can be measured accurately. Experience alone will give one the desired information as to the length of time the current should be applied and the number of milliamperes required for a thorough eradication of all tonsillar tissue. The variation in the amperage is from one hundred to one thousand milliamperes, depending upon the consistency of the tonsillar tissue and its depth. Roughly speaking, eight hundred milliamperes suffice with the active electrode well inserted in the tonsil and the indirect electrode in any other part of the body for a period of forty-five seconds; two or three sittings are usually sufficient.

Electrical desiccation by the unipolar method will necessitate a large number of treatments and after each sitting it may be necessary to use any of the ordinary curettes to take away the necrotic tissue. This method is not as desirable, owing to the fact that the spark may jump to any part of the oral cavity, especially if the uvula is elongated and has a tendency to swing laterally. However, the ultimate result is perfect. With the coagulation method the tonsillar tissue disappears in about ten to fourteen days following the last application, while with the desiccation method four weeks are usually necessary for complete eradication, depending entirely upon the thickness of the tonsil and the amount of application made at each sitting. It can be stated that this method is absolutely painless.

204 Securities Building.

Industrial Eye Injuries*

By FRANK ALLPORT, M.D.,

Chicago.

(First Communication.)

The substance of this paper should be considered under two headings, viz., prevention and cure. Let us first endeavor to ascertain what can be accomplished in the way of prevention of ocular injuries in industrial occupations.

1. PROPER EXAMINATION OF EYES PRIOR TO EMPLOYMENT.

One of the most important barriers to eye damage is a thorough examination by an oculist before an applicant is given employment. It is not sufficient to have such examinations made by a general practitioner, a nurse, or a layman, who merely tests vision with test types and makes a general or cursory survey of the eyes. Many important pathological conditions are only detectable by an experienced observer. Slight strabismus, minute corneal, vitreous and lenticular opacities; hidden iritic adhesions, fundal changes, abnormal visual fields, refractive errors, can be detected only by the experienced oculist—and it is these very conditions that are important to diagnose. It is essential that one should be cognizant of such abnormalities and possess records of the findings. It may be altruistic to assume the honesty of all men, but we who are disillusioned know that all men are not honest. My own experience leads me to believe that only a minority of men are honest when it comes to seeking financial remuneration for physical damages from rich corporations. Indeed, I am not perfectly sure I would not be dishonest myself under such circumstances. I suspect I should enlarge upon all possible physical ailments, feeling that after all I had worked hard for the company and had been damaged while in its employ, that there was no telling what might happen as a result of my accident, that I had a family to support, that the company was rich, while I, who did their dirty work, was poor, and, after all, why should I not get any money I could, without leaving behind any very strong conviction of real dishonesty. If, therefore, I, a reasonably honest, and I trust a reasonably intelligent man, could under stress of circumstances dally with the truth, is it not reasonable to assume that others, less endowed than I, would do the same? Thus it happens that industrial surgeons (particularly) are constantly brought into contact with more or less spurious demands for financial compensation for bodily damage, and one definite means of defeating such spurious claims is to have accurate physical records of all applicants for work, before work is assigned.

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*Read before the Chicago Society of Industrial Surgeons, November 6, 1922.

Not infrequently I see patients who have sustained some trifling eye accident, who at the same time have a senile cataract. Blindness as a result of the accident is the claim, and yet I know that there is no possible connection between the two conditions. The report of a proper physical examination, before employment, would probably clear up this claim at once, especially if physical examinations were required at intervals of, let us say, every two or three years. Men seeking employment invariably represent their vision and hearing to be of the best possible quality. They want work and they do not underestimate vision and hearing. But when they seek compensation for injuries they represent these functions to be as poor as possible, for reasons that are obvious to all. I, also, occasionally see patients, who have sustained a slight head contusion, in a few days complain of a bad smelling, discharging ear. An examination discloses an almost complete absorption of the drum head, and much necrosis and granulation tissue, conditions it takes months or even years to develop and conditions which, of course, have nothing whatever to do with the head contusion of a few days previously. These cases would have no standing in court if previous reports of such ear disease could be produced. Proper physical examination of applicants for work should be made before men are placed at occupation. Such examinations would cost something, of course, but not so very much after all, and it is, in reality, a form of insurance a business man cannot afford to ignore, for it will surely save him thousands of dollars in due course of time by being in a position to defy many spurious claims for damages. Employers should regard such examinations as a legitimate and necessary form of insurance.

Proper eye and ear examinations prior to employment will exclude from factories, etc., applicants suffering from contagious diseases, such as trachoma, hypertrophic papillary conjunctivitis, foul discharging ears and other contagious diseases, thus lessening the diseases in shops and the legal liabilities attendant thereon, to say nothing of the diminution of human suffering and disaster.

It must also be remembered that the most efficient and valuable services from workmen can be performed only when men are in the best physical condition and are working under the most advantageous circumstances. The physical examination of applicants, before employment, discloses their weaknesses, discards some altogether, and enables the employer to place those who remain at work in places harmonious with their defects, thus enhancing their value as working units and also permitting the employee to seek medical or surgical advice for the correction of (perhaps) unsuspected diseases. For instance, a man who has poor eyes can, perhaps, be fitted with glasses, or undergo treatment or operation for his relief, and can also be given employment somewhat consistent with his infirmity. A man whose ears have been found diseased or defective can seek the advice of an aurist, and be placed at work where good hearing is not necessary to successful employment. Thus it will be seen that proper physical examination before employment, and at subsequent suitable intervals, is not only valuable to the employer in protecting him from fictitious claims for damages, and in enabling him to obtain better and consequently more profitable labor, but it is also beneficial to the employee because it discloses defects and diseases and enables him to seek relief, and it also prompts his employer to give him work harmonious with his physical condition. The only thing it antagonizes is dishonesty and this furnishes no excuse for doing the right thing.

2. ILLUMINATION.

The proper lighting of shops is unquestionably of very great importance in the prevention of accidents and is a subject that is constantly assuming larger proportions in the minds of shop owners, architects and illuminating engineers. Insufficient illumination can undoubtedly produce diseased ocular conditions, but so also may excessive and improperly directed illumination. Daylight is the best illuminant and should be utilized as much as possible. The next best illuminant is the one that most nearly simulates daylight. Illumination should be ample but not excessive as too much light may be as injurious as insufficient light. Not only should illumination be ample and proper, as provided by enormous window spaces and by the best kind of artificial illumination, but the lighting should be properly directed so that each bench, wheel, vat, machine, etc., is individually well lighted and shaded so that the men can see distinctly and work without ocular effort, and almost automatically. Some shop owners with semiliberal minds, restrained by economical restrictions and possessing conceit, assurance and determination, equip their shops with illumination according to their own ideas, unhampered by the scientific and experienced advice of an illuminating engineer. They are, perhaps, determined to do the thing on a big scale and they install lights and plenty of them, in short their lights are an injury and an embarrassment to the employees. They are bad for the eyes. There is, perhaps, too much light, or at least it is improperly and unscientifically placed. It stares you in the face, it is dazzling, it makes work hard. Illumination should be ample but not excessive. It should be evenly diffused and should not fall directly into the eyes. It should come from above, behind and from the left. It should not throw shadows on the work. Bad lighting forces the workmen to pay too much attention to seeing distinctly. This should be done without effort, thus enhancing his value by increasing his output and, incidentally, saving his eyes.

Improper illumination produces mistakes in work, wastage of material, and a greater liability to accidents. Twenty-five per cent. of shop accidents are produced by improper illumination, and the least number of accidents occur in July and August because these months furnish more daylight than any other months in the year. The proper lighting of steel mills increases their output two per cent. and in textile and shoe factories the increase is ten per cent. It only costs about one quarter of one per cent. of a man's wages to light a shop properly. Thus, if a man earns three dollars a day, it will cost about one cent and a half a day to furnish him with proper illumination.

Shop owners should employ illuminating engineers to install their lighting; it will be cheaper in the end. Such men are quite agreed as to the superiority of the tungsten lamp. Its light closely resembles daylight and is cheap and durable. They should be supplemented with white porcelain enameled reflectors, and the entire lighting system should be kept clean. White walls and woodwork and clean windows will add about thirty per cent. to the efficiency of natural or artificial illumination.

3. SHOP GOGGLES.

I am happy to say that shop goggles are being worn more and more by shop workers. Not very long ago most men almost disdained the wearing of goggles. Some felt it was cowardly, others said they were a nuisance, interfered with their work, became easily fogged, etc. Almost all shops were glad to furnish goggles, but most of them remained in the shop unused. Many of the men are densely ignorant foreigners whose mental habit refused to adopt innovations. The habit of wearing goggles gradually grew, inspired by educational pamphlets, talks, notices, pictures, etc., and now a vast majority of workers in shops wear goggles. They have learned that it is a good thing, that it saves the eyes, that it is a necessity. The Pullman Company declares that thirty-five per cent. of shop injuries are eye injuries and that most of them could have been prevented by the wearing of goggles. There are many kinds of goggles on the market, but the best are the Saniglass goggles. They fit well, have side shields, and the glass is clear, thick and very strong. The glass can, of course, be ground to correct the workman's refractive error, if he has any, and can be colored in any tint to harmonize with the man's occupation.

In the American Steel Foundries shop eye accidents were reduced seventy-five per cent. in two years by wearing such protection. In order to give an idea as to the kind of occupations producing the most eye accidents in the ordinary steel shop, I will say, 1, that undoubtedly hammering produces more eye accidents than anything else. Then comes, 2, emery wheels; 3, molten metals; 4, electric flashes; 5, riveting; 6, machine tools; 7, bursting of water and lubricating glasses, and, 8, belting.

4. TOOLS AND PROTECTIVE DEVICES.

Improper tools and the absence of suitable protective devices for machines, produce many eye accidents.

Most hammering accidents are caused by using tools with burred or mushroomed edges. When such tools are used steel particles are easily broken off and fly with great velocity into the eye, producing serious consequences. Tools should be kept in good condition and when the edges become even slightly mushroomed, they should be immediately repaired, a precaution which will save many eyes from blindness.

Modern shops are being more and more furnished with all kinds of safety devices, for they have been found to be both beneficial and economical. Shops should be kept cool, clean, light, and as nearly dustless as possible, for men can accomplish more and work better under such circumstances. Emery wheels should be protected by glass or leather guards or hoods, and dust particles should be sucked away by an exhaust system. Emery wheel accidents are very frequent and some men who work at emery wheels have their corneas speckled by the oft repeated assault of emery wheel particles. I have seen the glasses or goggles of emery wheel workers speckled so that they looked almost like glazed glass, so often have the glasses been struck with flying particles.

Vats containing molten metal should be handled carefully and should be surrounded by protectives. Goggles, or, still better, leather masks with goggles, should always be worn when handling molten and babbit metal, for burns from splashing molten metal are most gruesome and discouraging in their character.

Electric flashes can be avoided by using enclosed switches and fuse boxes. Riveting and punching machine accidents can best be avoided by care and the use of goggles. Milling machines, shapers, etc., should be protected by what is known as glass chip guards. Water and lubricating glass accidents can be much reduced by using the very best glass and by protecting the glass with suitable guards as the contents are under constant and strong steam pressure.

Eyes are sometimes injured by being struck with broken belting caused by improper jointing. Endless or glued joint belts should be used instead of hooks or lacings to make a joint. Belts should never be replaced on a pulley by a stick as is so frequently done. Serious eye accidents sometimes result from such practices. Excessive light or heat in shops, particularly steel shops where electric welding is done, may produce retinal and other eye injuries. The temperature and light in these furnaces is tremendous. Cast iron furnaces possess a temperature of 2,000° F., and in electric welding the temperature may rise to a height of 12,000° F. Such heat and glare may produce retinal and optic nerve changes and burns of the skin, conjunctiva and cornea. Screens of blue or red glass should be used and the workman should wear an aluminum helmet. Retinal changes may occur from grinding carbon or manganese steel, where the worker looks constantly into a steady stream of sparks and while doing this work amber goggles should be worn. Amber goggles should be worn by glass blowers to prevent cataracts and by silver burnishers, who look protractedly upon highly polished surfaces, to prevent retinal changes. Goggles should be worn when the oxyacetylene torch or electric are in use.

5. THE SHOP OCULIST.

The individual who has come to be known as the shop oculist deserves a section all to himself, as he is one of the greatest menaces to eyesight in the average shop. Fortunately the public has become considerably educated concerning such matters and the career of the shop oculist is on the wane. He still exists, however, in many shops and until he is utterly exterminated, the propaganda against him should continue. He is one of the great body of workmen who has acquired an undeserved reputation for removing foreign bodies from the eyes of his brother workmen. He is ready at any time to suspend his dirty work, and with unwashed hands, endeavor to remove a particle of any nature whatsoever from the eye of some unfortunate workman. He proceeds to his unwarrantable work, as I have said, with dirty hands, with conceived assurance, with poor illumination and tools, and without lenses and cocaine or adequate knowledge. Sometimes his efforts are successful and harmless and this, of course, adds to his assurance, egotism and reputation. But frequently, alas, in endeavoring to remove a tightly driven foreign body from the cornea, with dirty hands and tools, with improper illumination and a moving and roving eye and without cocaine or antiseptic precaution, he only succeeds in mutilating and infecting the cornea and, finally, after having done his best, or, rather, his worst, advises the injured victim to do, what he should have advised him to do at the start, viz., go at once to a competent oculist. The appearance of such eyes when they come into my hands is often appalling, and require heroic treatment, but at the best a large scar usually remains which more or less impairs vision in accordance with its density, extent and location. But many of these cases go on to a violent infection, ulceration, hypopyon, panophthalmitis, and enucleation. It seems to me, as I look back over a large and varied experience of ocular accidents, that I have seen more eyes destroyed by the improper initial treatment of minor injuries than from any other one cause.

The removal of foreign bodies from the cornea should be considered a serious affair and should not be undertaken by laymen or general practitioners. I hope I do not offend my general practitioner friends when I say this but, as a rule, they have no more qualifications to do this work than I have to treat measles or mumps. Some particles are easily removed from an unanesthetized cornea, but most of the invaders have to be dug out with a spud or a cataract knife and herein consists the danger. They should be removed under strict aseptic precautions by an experienced and steady hand with proper illumination and lenses, and with the infliction of as little damage to the cornea as possible. This is frequently a tedious and nerve racking affair and only experienced and patient ophthalmologists are adapted to the work. Foreign bodies are sometimes deeply imbedded, and are almost impossible of removal, even by the exercise of great skill, experience and tact, and the use of fluorescin to outline the site of injury. Such injured men should be given the best chance for the preservation of vision and such an opportunity does not follow the ministrations of the shop oculist, shop nurse, and I am sorry to say, not always the shop doctor. Such cases should be sent immediately to a competent oculist, thus saving eyes, vision, suffering and expense.

6. DANGER TO VISION FROM CERTAIN OCCUPATIONS.

Attention should be paid to the fact that certain occupations are likely to injure vision and every precaution should be taken to prevent this disaster. For instance, dinitrobenzine, which is used in manufacturing aniline dyes, injures vision by inhalation, which can be prevented by ample ventilation or by using closed mixing vessels. Bisulphide of carbon, used in vulcanizing rubber, produces a vapor which injures vision by producing retinal and optic nerve changes with a very poor prognosis. Nicotine may be absorbed in tobacco factories, with characteristic ocular symptoms. Amblyopia may develop in both tobacco workers and tea tasters. Paper hangers, painters, workers in arsenical preparations, etc., demonstrate the fact that arsenic is absorbed principally through the respiratory tract, producing eye pain and irritability, optic neuritis and atrophy. Eyes are damaged in plumbers and painters where lead is used. Lead enters the body through the fingers and lungs. Headaches, poor vision, scotoma, ptosis, paralysis, etc., are noticed. Carbon monoxide very occasionally produces optic nerve and retinal disturbances and paresis of the ocular muscles.

Most of the ocular disturbances from chemical causes can be avoided by strict cleanliness, especially of the hands, and by thorough ventilation. Wood alcohol is used in many industries and workmen should always be acquainted with the fact that they are dealing with a deadly poison, capable of producing blindness from optic nerve atrophy, and even death. It is used, for instance, in cleaning off shellac from the interior of beer vats, where the fumes become very strong, especially when the ventilation is poor. This menace can be combatted by using as little of it as possible, and by extreme cleanliness and thorough ventilation.

High explosives in mining, railroad construction, etc., produce many serious eye accidents. Bursting bottles in charged water factories and lime burns in masons, bricklayers, plasterers, etc., often produce disastrous ocular damages. Great care under such circumstances, with a full realization of the damages involved, will prevent many sad accidents. The eyes of miners are not only threatened by explosives, in dislodging coal, but by nystagmus from working underground with insufficient illumination and from working while lying on the back. Mines should be abundantly lighted, abnormal postures while at work should be avoided, errors of refraction should be corrected, the health should be kept up to the highest standard, and the hours of submerged work should be as short as possible.

Certain occupations, involving exposure of the eye to heat and light, may produce slowly developing cataracts. This is conspicuously the case with glass blowers but may also occur in any industry where the eyes are exposed for long periods of time to intense heat and light. The greatest protection consists in wearing thick colored glasses that disperse both heat and chemical rays.

I am well aware that this paper has not completely covered the subject. It would have to be much longer to do this, and I did not feel at liberty to occupy too much time. Enough has been said, however, to demonstrate that almost all occupations possess dangers to eyesight that should be thoroughly understood and carefully guarded against. But before closing this article I wish to say a few words for the benefit of the great army of office workers whose eyes are being damaged by protracted work on books and papers by poor illumination, and without having their eyes properly corrected by glasses, perhaps purchased at a place where examinations are free. All of these details should receive proper attention by those who are earning a living by visual work performed in an office or store.

In a later paper I intend considering the treatment of eyes that have been injured in industrial occupations.

7 West Madison Street.

An Analysis of Twenty-nine Cases of Uremia*

By HENRY M. FEINBLATT, M.D.,
Brooklyn.

Before the days of blood chemistry, the term uremia was used to designate a group of symptoms which usher in the fatal ending in a large proportion of cases of renal disease. Hence a protean symptomatology, dependent upon varying underlying causes, was scrapped together and placed under the common caption of uremia. Efforts to discover the cause were largely unsuccessful, because no one experimental or pathological condition could account for the whole picture.

Von Wilson (1) in 1833 described the syndrome and attributed it to urine retention following renal insufficiency. At about the same time Bright (2) and his coworkers, Bostock and Christison, demonstrated an actual increase in the urea of the blood in this group, and, believing this substance to be the toxic agent, called the condition uremia.

Much investigation has been carried on with the other urinary substances, and each of the different constituents has at one time or another been designated as the toxic product. That no one of the contained substances known is the causative factor is now generally admitted. The complex is attributed to all of the retained noxious products normally excreted.

Uremia due to total ablation of renal function closely simulates the condition obtained in experimental animals but differs widely from the common description. I have had an opportunity of studying four such cases; one case of surgical removal of the kidney in which the other kidney was functionally useless; one case of bilateral impaction of the ureters with calculi; two cases of anuria due to bichloride poisoning.

Headache, increasing drowsiness gradually merging into coma, muscular irritability, increased tendon reflexes, restlessness, vomiting, and ammoniacal breath comprise the clinical picture. Conspicuously absent are convulsions, amaurosis, transient paralyses, and delirium.

These latter evidences are now admitted to occur in the eclamptic type and to be due to other causes than nitrogenous retention. Volhard (3) adheres to Traube's old view and ascribes them to cerebral edema. There is abundant confirmation of this theory. It has been repeatedly observed that the spinal fluid is under increased pressure and that rachiocentesis is followed by diminution of convulsions and marked amelioration of the mental symptoms. Necropsy reveals edema of the meninges and of the cerebral cortex. Hemiplegic and amaurotic patients have shown after death focal edema of the precentral and cuneate gyrus respectively. Widal has demonstrated chloride retention and ascribes the edema to that factor. In 1916, Foster (4) announced that he had isolated a crystalline, convulsive toxin.

Under the term azotemia, Widal describes the syndrome of nitrogenous retention due to renal inadequacy. The author concurs with him in the belief that the term uremia should be limited to this group of cases. The phenomena due to other causes should be separated from this category and the caption uremia narrowed to the clinical picture of retention. Considered in this light, uremia is chiefly evidenced by the blood chemistry and nitrogenous retention is a *sine qua non*. A distinct type is represented as regards cause, clinical course, prognosis, and indications for treatment. Inasmuch as the textbook descriptions of uremia include practically all serious manifestations found in nephritics, it is felt that the study of a series of cases of nitrogenous retention is in order. To include under the same heading disturbances due to cerebral edema, arteriosclerosis, cardiac decompensation, and other factors is confusing and often misleading.

Twenty-nine cases of uremia in the wards of the Long Island College Hospital were studied according to a definite scheme. The purpose was to take another point of view. Instead of considering the blood chemical analysis as confirmatory of the clinical picture, a series of cases of known chemical uremia was collected and the findings were analyzed with an unbiased attitude. The criterion of the presence or absence of uremia was the blood chemistry. This report includes all cases due to kidney insufficiency in which the blood urea nitrogen rose to fifty mgms. to the hundred c. c. or more.

The data tabulated in these cases are summarized under the headings blood chemistry, etiological factors, symptomatology, urinary findings, blood findings, eye signs, cardiovascular changes, complications, and outcome.

BLOOD CHEMISTRY.

Normal figures: Urea nitrogen 12-15 mgms. per 100 c. c. Uric acid 2-2.5 mgms. per 100 c. c. Creatinin 1-1.5 mgms. per 100 c. c. Sugar 90-110 mgms. per 100 c. c.

These determinations were all made according to the method of Folin and Wu (6). Ten c. c. of blood are sufficient for determination of all four ingredients. Folin's method was chosen because of its greater simplicity and its accuracy. In the sugar estimations comparative tests were made with the old and new Folin methods and the readings were found to coincide. It was a routine procedure to draw the blood before breakfast and to make the analysis the same morning.

In this group urea nitrogen is the most constant of all the nonprotein nitrogen ingredients and furnishes the most reliable index to the progress of the disease. Uric acid is the most variable factor, and, while always increased, does not rise in the same ratio with urea nitrogen. In case No. 22 the uric acid was only five mgms. to 375 mgms. of urea nitrogen, while in case No. 11 the uric acid measured fifty mgms. to 300 mgms. of urea nitrogen. Creatinin bears a more constant relation to urea nitrogen and tends to increase in the same ratio. Sugar values appear to bear no relation to retention of nitrogen. Even in cases where the urea nitrogen rose to 375 mgms. the sugar values were very frequently within normal limits. In those cases where the sugar content was above normal, this finding was apparently due to decreased tolerance rather than to retention. Experimenting by adding known amounts of creatinin and uric acid, the author was able to satisfy himself that sugar readings with Folin's method were not influenced by retention of these substances.

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*From the Clinical Laboratory, Department of Internal Medicine, The Long Island College Hospital, Brooklyn, New York.

ETIOLOGICAL FACTORS

Family history. A history of nephritis in the ascendants was obtained in only three cases.

Sex. There were twenty males and nine females. These figures are approximately proportional to the relative rates of admission to the medical service for the sexes.

Age.—First decade, 0; second decade, 1; third decade, 12; fourth decade, 4; fifth decade, 7; sixth decade, 3; seventh decade, 1; eighth decade, 1.

Thus twenty-three cases or seventy-nine per cent. appeared between the ages of twenty and fifty. Only one instance occurred before the age of twenty. In younger patients true chemical uremia is unusual. Here symptoms due to cerebral edema complicating acute glomerular nephritis are the rule. The distinction is of supreme importance in prognosis.

Occupation. A study of occupation revealed no apparent relation to the condition.

Underlying renal condition.—Chronic glomerular nephritis, 18; mixed type, chronic glomerular nephritis plus nephrosis, 4; necrosis due to bichloride poisoning, 2; amyloid kidney, 1; nephrosis, 1; acute glomerular nephritis, 1; arteriosclerotic kidney, 1; nephrectomy, one; kidney functionally useless, 1.

In twenty-two out of twenty-nine cases, or seventy-six per cent., chronic glomerular nephritis was responsible for the improper elimination. In striking contrast to this figure uremia was attributable to acute glomerular nephritis in only one instance.

Considering the fact that the Long Island College Hospital maintains an acute medical service, the low incidence of acute nephritis is surprising. A few acute nephropathies were studied, but in only one case of acute glomerular nephritis did the blood urea nitrogen approach 50 mgms. to the 100 c. c. Chloremia appears to be the rule here. When this group was placed upon a fixed chloride diet and the output was measured by Volhard's method, a definite chloride retention could be demonstrated.

Antecedent infections and intoxication.—Tonsillitis, 7; scarlet fever, 7; syphilis, 3; rheumatism, 2; bichloride poisoning, 2; empyema, 1; pulmonary tuberculosis, 1; malaria, 1; diphtheria, 1; gout, 1.

Only those antecedent infections and intoxications which bore an apparent relationship with the onset of uremia were included in this tabulation. Scarlatina and tonsillitis stand first in importance. Recurrent attacks of tonsillitis seemed to be the last straw. Possibly each infection caused an acute focal glomerular nephritis without symptoms. When the safety limit of destruction of renal units was passed, waste products began to accumulate in the blood.

SYMPTOMATOLOGY.

Frequency with which various symptoms occurred:

Drowsiness	22
Coma	18
Vomiting	18
Edema	14
Restlessness	12
Dyspnea	12
Headache	11
Increased tendon reflexes	11
Twitchings	7
Emaciation	7
Nycturia	6
Cough	6
Amaurosis	5
Polyuria	5
Epistaxis	5
Hiccough	5
Vertigo	5
Ascites	4
Diarrhea	4
Anuria	3
Precordial pain	3
Convulsions just before death	3
Delirium	3
Petechial hemorrhages	2
Itching	2
Epigastric pain	2
Hematemesis	1
Pain in limbs	1
Chills	1
Backache	1
Tetany	1

It is noteworthy that the symptoms standing highest in frequency are, with the exception of edema and dyspnea, those observed in experimental animals and in cases of total ablation of renal function. The essential symptoms of uremia, therefore, are increasing drowsiness gradually merging into coma, vomiting, restlessness, headache, increased tendon reflexes, and muscular twitchings. The numerical importance of edema and dyspnea is probably exaggerated by concurrent cardiac decompensation in a certain percentage of cases.

Edema was present in fourteen patients. It was directly attributable to a lesion of the convoluted tubules in seven instances (six cases of the mixed type, chronic glomerular nephritis plus nephrosis and one of nephrosis); to myocardial insufficiency three times; and once to acute glomerular nephritis. Therefore it appears that edema is merely an inconstant concomitant of uremia, due, when present, to associated tubular degeneration or cardiac incompetence.

The low frequency of convulsions is in striking contrast to the importance so commonly attached to them. In all three instances the convulsions did not appear until immediately before death, and they were apparently due to asphyxia of the brain.

URINARY FINDINGS

Albuminuria	28
Cylindruria	18
Red blood cells in urine	10
Complete anuria	1
Hyposthenuria	12 out of 16 cases

BLOOD FINDINGS

Red blood cell count in twenty-seven cases.

1,500,000-2,000,000	1
2,000,000-2,500,000	1
2,500,000-3,000,000	1
3,000,000-3,500,000	3
3,500,000-4,000,000	5
4,000,000-4,500,000	8
4,500,000-5,000,000	6
5,000,000-5,500,000	2

The average red blood cell count was 3,750,000.

Hemoglobin (Sahli's method) in twenty-five cases.

20 per cent.-30 per cent.	1
30 per cent.-40 per cent.	1
40 per cent.-50 per cent.	0
50 per cent.-60 per cent.	3
60 per cent.-70 per cent.	7
70 per cent.-80 per cent.	11
80 per cent.-90 per cent.	2

The average hemoglobin was sixty-three per cent. Sahli. The average color index was 0.84.

In no case did the color index reach as high as one. In some of these cases the red blood cell volume was determined. The findings did not run parallel with the cell count and the hemoglobin. Therefore, it would appear that the red blood cell count is not a reliable index to the degree of hydremia.

WASSERMANN REACTION.

Positive	3
Negative	20
Not reported	6

These findings would indicate that the retained nitrogenous products of uremia do not give rise to false positive Wassermann reactions. One of the positive cases was complicated by general paresis. The urea nitrogen in the three positive cases was 60, 75, and 150 mgms., respectively, which findings lead us to believe that retained nitrogen does not interfere materially with the reaction.

EYE SIGNS.

Papilledema with vascular degeneration	8
Albuminuric retinits with vascular degeneration	7
Retinal hemorrhages with vascular degeneration	5
Vascular degeneration uncomplicated	3
Stiff pupils	2
Petechial hemorrhages over scleræ	1
Exophthalmos	1
Ptosis of upper lid	1

CARDIOVASCULAR CHANGES

Cardiovascular changes investigated were cardiac hypertrophy, blood pressure, and arteriosclerosis.

The evidences upon which judgment as to cardiac hypertrophy was based were physical examination, x rays, and postmortem examination. The figures indicate that in thirty-eight per cent. of cases the hypertrophy was not determined clinically. It is thus apparent that absence of hypertrophy does not exclude uremia.

Cardiac hypertrophy present	18
Cardiac hypertrophy absent	9
Cardiac hypertrophy doubtful	2

BLOOD PRESSURE:

Systolic.		*Diastolic.*		PULSE PRESSURE:	
75-100	1	50- 75	1	20- 30	2
100-125	2	75-100	12	30- 40	1
125-150	6	100-125	3	40- 50	6
150-175	7	125-150	9	50- 60	5
175-200	9	150-175	4	60- 70	7
200-225	1			70- 80	2
225-250	3			80- 90	4
				90-100	1
				100-110	1

Average systolic blood pressure 168. (This average was markedly reduced by one case complicated with chronic pulmonary tuberculosis, one with cardiac decompensation, and two with bichloride poisoning.)

Average diastolic blood pressure 108.

Average pulse pressure sixty.

Arteriosclerosis was definitely observed in eight cases.

COMPLICATIONS.

Myocardial insufficiency	3
Perforation of uterus with pelvic peritonitis	1
Bronchopneumonia	1
Cerebral thrombosis	1
Lobar pneumonia	1
Mitral insufficiency	1
General paresis	1
Gangrenous stomatitis	1
Pulmonary tuberculosis	1
Otitis media	1

OUTCOME.

Died in hospital	25
Discharged unimproved	3
Discharged improved	1

Retention of urea nitrogen in the case that showed improvement never rose higher than fifty mgms. to the 100 c. c. and the creatinin was normal. The man was a sailor and has not been heard from since he left the hospital.

These figures demonstrate the importance of distinguishing chemical uremia as an entity in so far as prognosis is concerned. In the retention group the outlook is practically hopeless. As an index to the severity of the case, the blood chemical analysis is much more trustworthy than the clinical picture.

SUMMARY

All of the cases of nephropathy occurring in the wards of the Long Island College Hospital were studied according to a fixed scheme, laying particular stress upon the blood chemical analyses. From this group there were separated all those cases which showed a urea nitrogen of fifty mgms. to the 100 c. c. or more. I believe that the term uremia should be strictly limited to this category of nitrogenous retention due to renal inadequacy.

As regards blood chemistry, urea nitrogen was found to furnish the most reliable index to the progress of the case and to bear the greatest prognostic value. Increases to figures of 300 mgms. per 100 c. c. invariably portended death in a few days. Uric acid was very variable, and, while always increased, maintained no ratio with the urea nitrogen. Creatinin tended to rise in the same proportion with the urea nitrogen.

The study of etiological factors would indicate that heredity, sex, and occupation are not important predisposing causes. As to age twelve of the twenty-nine cases appeared in the third decade. The most important underlying renal condition responsible for uremia is chronic glomerular nephritis, being present in twenty-two instances. Acute glomerular nephritis was accountable for only one case of uremia. Tonsillitis and scarlatina were the most frequent antecedent infections.

The symptomatology revealed a surprising similarity to nephrectomized animals and to instances of total deprivation of renal function in man. Drowsiness gradually merging into coma, vomiting, edema, dyspnea, increased tendon reflexes, restlessness, and headache stood highest in frequency. Concurrent cardiac decompensation is undoubtedly responsible for the edema and dyspnea in many instances. Eclamptic evidences were infrequent. Convulsions occurred only three times and always just before death. The urine showed evidence of nephropathy in every case.

A moderate grade of secondary anemia was present in the majority of cases. The average red blood cell count was 3,750,000; the average hemoglobin, sixty-three per cent.; the average color index, 0.84. The Wassermann reaction was positive in only three out of twenty-three patients.

Cardiac hypertrophy was positively determined in eighteen cases; arteriosclerosis, in eight. The average systolic blood pressure was 168; diastolic, 108; pulse pressure, sixty.

Myocardial insufficiency was the most important complication. It was directly responsible for death in three cases.

The author's references will appear in his reprints.

The Standard Treatment for Malaria

By C. C. BASS, M.D.,
New Orleans, La.

The standard treatment for malaria recommended by the National Malaria Committee is, "For the acute attack ten grains of quinine sulphate by mouth three times a day for a period of at least three or four days, to be followed by ten grains every night before retiring for a period of eight weeks. For infected persons not having acute symptoms at the time only the eight weeks' treatment is required." It will be noted that there are two parts of the treatment, the first to relieve the clinical symptoms and the second to cure the infection. In the present paper the effectiveness of the first part of the treatment for the purpose of relieving the clinical symptoms will be discussed.

Fever or chills and fever are the most constant clinical symptoms of malaria. They are definite symptoms. Fever is measurable and susceptible of statement in definite terms of temperature. Although other symptoms may also be present, they are not recognizable or demonstrable in all cases. It often occurs that a person may have a few malarial parasites in his blood without having any recognized symptoms due to the infection. However, if his resistance gets low enough to allow the parasites to multiply sufficiently to produce any clinical symptoms and an active case of malaria develops, he is certain to have fever, if not chills and fever. These being the most prominent and constant clinical symptoms, they serve as a reliable guide as to the effect of treatment. Any treatment that relieves them relieves any other symptoms of active malaria that may be present.

There is a general impression and belief that although quinine relieves these symptoms in most cases, there are some in which fever or chills and fever persist for days and sometimes for weeks in spite of full quinine treatment. Such opinions are unfortunately expressed or supported by many of the prominent authorities on malaria.

It often happens that in supposed cases of malaria unnecessarily large amounts of quinine are given in one form or another over considerable periods of time in an effort to break the fever, much to the detriment of the patient. In such cases the diagnosis was usually incorrect, and the patient either did not have malaria at all or, if malaria was present, there was some other coexisting disease or condition responsible for continuation of the symptoms. Malaria played no part in their production.

During the past six years fortunate circumstances have brought me into contact, direct or indirect, with the treatment of a great many people for malaria. The effectiveness of the standard treatment in relieving the clinical symptoms has been kept constantly in mind and special search has been made for cases in which it failed. Many cases in which this has been reported have been investigated. Up to the present time not a single case has been found in which fever or chills and fever due to malaria have continued for four days when the patient was taking as much as thirty grains of quinine daily.

During the past year a further effort has been made to find these socalled resistant cases of malaria by keeping in touch with the cases of malaria in the large hospitals of New Orleans through the kind assistance of interested medical students. The date on which the patient began taking quinine and the amount taken were recorded. Any case in which the patient was given as much as thirty grains of quinine daily and in which the temperature rose above normal on or after the third day was reported to me for personal investigation. Thus far four cases have required investigation.

In one of these, tertian parasites had been found and confirmed by me just three days previously. Thirty grains quinine sulphate had been given daily for four days and the patient now had a temperature of 104° F. Investigation revealed some delirium, rose spots on the abdomen, gurgling in the right iliac fossa, tympanitis, positive Widal, and typhoid bacilli grew in the blood culture. This was a case of malaria and typhoid. There were no malaria parasites found at this time. The typhoid was the cause of the fever.

In two other cases it was found upon investigation that the nurse had recorded the quinine as being given, depending upon the orderly to give it. One patient had actually received one dose of ten grains and the other two at the time of investigation of the supposed failure of the treatment. They were given thirty grains of quinine daily and the temperature did not rise above normal in either of these cases at any time after the first twenty-four hours during which they actually received the quinine.

The fourth case was one in which the diagnosis was made by the laboratory man on one doubtful parasite found on one of the many blood examinations made. The patient continued to have irregular chills and fever for several weeks, although she was given as much as fifty or sixty grains of quinine daily for several days at a time. The chills and fever finally stopped without a diagnosis being made. It was not malaria.

During this period of six years, when the question of the effectiveness of the standard treatment has been kept constantly in mind and resistant cases have been sought, I have been unable to find a single case in which the clinical symptoms were not entirely controlled within a period of four days by as much as thirty grains of quinine daily. So far as I have been able to ascertain, no such case has occurred in the large hospitals of New Orleans during the past year, during which time they have especially been sought here.

Although I am not prepared to say that such exceptional cases do not occur, they are at least so rare that I have not been able to find even one case. Therefore, so far as my own experience and observations go, the standard treatment is one hundred per cent. effective in controlling the clinical symptoms of malaria.

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*Read at the annual meeting of the American Therapeutic Society, May, 1922.

Retinitis Associated with Disease of the Cardiovascular System*

By WILLIAM L. BENEDICT, M.D.,
Rochester, Minnesota,
Section on Ophthalmology, Mayo Clinic.

In 1892 Gunn presented to the Ophthalmological Society of the United Kingdom a patient with changes in the retinal arteries which he said were identical with those seen in a case of chronic albuminuria exhibited at the same session of this society. He referred particularly to four features of vascular change: 1, the sharpness and distinctness of the central light streak; 2, the color of the whole surface of the vessel which is lighter than normal; 3, a metallic appearance resembling bright copper wire, and, 4, impeding of circulation in the retinal vein, wherever an artery or even a small twig passes over it. This appearance Gunn considers an evidence of high arterial tension. He believed that the metallic, copperlike appearance of the vessels, noted with the ophthalmoscope, was caused by hyaline degeneration of the arterial walls, and he reports that it had been observed in many cases of chronic albuminuria, and in several cases in which no albumin was found, but in which the high arterial tension suggested the probability of changes in the arteries, similar to those usually associated with chronic renal disease.

In a paper before the same society in 1898, Gunn described "uncertain ophthalmoscopic changes . . . dependent primarily on an affection of the retinal arteries," and gave his opinion that, "such visible primary changes in retinal arteries are commonly, if not constantly, a part of a similar, more general, and therefore more important change in small arteries elsewhere." These ophthalmoscopic changes in the retinal arteries described by Gunn and attributed by him to certain causes on clinical grounds and on the pathological findings of Gull and Sutton, constitute the visible contributory factors of the picture said to be typical of ophthalmoscopic findings in cerebrospinal arteriosclerosis, in general arteriosclerosis, and in nephritis associated with increased arterial tension. So far as the description of the retinal arteries is concerned, it might apply as well to the retinitis of diabetes. The retinitis that is associated with any constitutional disorder may show one or more of the arterial changes here described, as indeed chronic vascular disease is a common occurrence, found even rather early in life, but is more common in persons of advancing age, and in those who have suffered from chronic intoxications. Other factors that make up the syndrome, such as hemorrhages, exudate, edema, and their sequelæ, are of secondary importance in their significance, are often the direct result of the vascular changes, and are merely corroborative details of the picture, which point to additional sources of disorder, and direct attention to concurrent organic disease. Even the absence of visible arterial changes in a retina that contains a number of hemorrhages and areas of exudate is a finding of the first importance in considering the relation of the retinitis to any disease in a diagnostic or prognostic sense, and whatever other changes are found must be grouped about the normal appearance of the arteries, just as much as if arterial changes were present. It may be assumed that the capillaries take some part in producing the appearance of the fundus in such conditions as are brought about, or accompanied by frank vascular disease, whether it be primary or secondary, but unfortunately the capillaries are not visible, as such, by any means we have at hand for adequate examination of the living eye, and microscopic examination has not contributed information which would indicate that any important rôle is enacted in the capillary area. The precapillary bed composed of the visible arterioles in the retina is available for study under magnification of about fifteen diameters, an advantage not gained elsewhere in the body, and has the further advantage of being quite similar in every respect to the precapillary bed in the central nervous system, and is not exposed to outside influences as are the vessels of the conjunctiva or other mucous membranes, or of the nail bed in the fingers. There is little evidence to be found, either by clinical examination or microscopic study, that the retinal veins play any important part in the production of the changes seen in the fundus in diseases of the cardiovascular renal system, and the changes that are produced in the veins themselves are apparently secondary to change in the artery, the heart, or the chemical constituents of the blood.

I am not unmindful of the difference of opinion expressed by pathologists as to what properly constitutes arteriosclerosis and the manner in which pathological changes are produced, but for our purpose all changes which lead to thickening of the wall of the artery, or hypertrophy of any of its coats, may be classed as arteriosclerosis. The reason for the inclusion of all varieties of arterial thickening becomes apparent when we consider the end stages of any given process, and the frequency with which the various factors responsible for the changes act at the same time. Marchand includes in arteriosclerosis all those changes of the arteries which lead to a thickening of the wall, particularly of the intima, in whose development degenerative changes (fatty degeneration with its results) sclerosis and calcification (including calcification of the media) arise, together with inflammatory and productive changes (15).

ETIOLOGY.

Sclerosis of the retinal arteries may safely be said to arise from three main sources, primary atheroma, hyperpiesia, and toxemia and inflammation. Disease of the kidneys as a cause of retinal arteriosclerosis is of secondary importance, for although nephritis is often indicated by the ophthalmoscopic picture, its part in producing retinitis is to fill in details around the vascular system of the retina, and is probably additive rather than causative. In a discussion on this subject in January of last year I made the statement that "the most prominent factor in the production of retinitis of diseases of the vascular system and of nephritis is sclerosis of the retinal arteries, to which are added other features characteristic of the etiologic factor of the sclerosis, and a careful analysis of the ophthalmoscopic picture presented may indicate the type of constitutional disorder back of it all, and give important information with regard to its severity and course."

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*Read before the Buffalo Academy of Medicine, November 29, 1922.

ATHEROMA.

When one reviews the original communications of Gunn on the ophthalmoscopic evidence of general arterial disease, and the many articles on the subject, that have since appeared in the literature, it seems strange that no definite attempt has been made to follow the clue given by the ophthalmoscope to the changes in the arteries, and to trace back through the vascular system the course of events that has led up to those changes. While many observers have called attention to the various stages of vessel change, they have added little to the original description of those changes by Gunn, and so far as I know the occurrence of those changes in essential hypertension has not been brought out, but has been considered a part of the syndrome of advanced cardiovascular disease. I wish particularly to call attention to the group of cases to which we refer as essential hypertension in persons who have no evidence of nephritis, except occasional albuminuria.

Attention has been directed to the copper color of the distended arteries, to the central light streak reflex and to the fine white lines along the course of the arteries in advanced cases, all of which were mentioned by Gunn in his original communication. Statistical records of retinal changes have been compiled with the findings in the urine, blood, and blood pressure in persons presenting evidence of nephritis and cerebral sclerosis, but the character of the changes in the retinal vessels has not been differentiated, nor has the sequence of other organic changes been noted. No doubt this is largely due to the questionable significance of high blood pressure and the conservatism of physicians and pathologists, but it seems that sufficient data are now obtainable to warrant a differentiation of cases of high blood pressure, and to set apart the cases of primary sclerosis from those in which sclerosis is secondary to hypertension, basing the diagnosis and prognosis on the appearance of the retinal vessels.

Textbooks do not point out the retinal changes characteristic of early hypertension with late sclerosis, and these conditions are not distinguished from the mixed symptoms which characterize the late stages of involutional degeneration, toxic vasculitis, and hyperpiesia. No statistics are available from which to estimate the relative incidence of the involutional degenerative type of sclerosis. Several studies, however, have been made from which it can be concluded that nephritis is not a necessary complication, and that increased blood pressure is not present as a rule. Furthermore, as Barker says, "the time seems to have come when the significance of sclerosis of the arterioles must be sharply discriminated from that of sclerosis of the rest of the arterial system. And when one uses the term, arteriosclerosis, he should, to avoid confusion, make clear in each instance the part of the arterial system to which he is applying the term."

As I have said in a previous paper, the sclerosis of involutional degeneration is not the same as that of the degeneration that follows hyperpiesia and both forms may differ from the sclerosis brought about by the perivasculitis of syphilis, lead poisoning and other chronic intoxication. The ophthalmoscopic picture is not always clear, and opinions of various observers may differ in cases which are not well-marked, but a sufficient number of cases may be differentiated to make the attempt well worth while because of the aid given the clinician in his attempt to reach a definite diagnosis.

ARTERIOSCLEROTIC RETINITIS.

The retinitis of primary arteriosclerosis, when uncomplicated, is characterized by arteriovenous compression, contracted arteries whose calibre is not materially decreased, pipestem sheathing, arterial plaques, beading, increase in the light reflex stripe, and silver wire arteries. There are hemorrhages in the nerve fibre layer, proliferation of new vessels, arterial injection of the nerve head, giving it a brick red color, and extreme tortuosity and increase in the number of the arterial twigs in the region of the macula. Small areas of capillaries are deprived of blood supply, giving rise to ischemia and white spots. Only rarely is edema present.

These evidences of arteriosclerotic retinitis are not present at all times and all stages of the process. With the ophthalmoscopic findings just described, and low blood pressure, cerebral arteriosclerosis and an absence of systemic sclerosis would be suspected; on the other hand, with high blood pressure, the presence of systemic sclerosis also would be suspected. The sclerosis of the arteries, giving rise to these symptoms of arteriosclerotic retinitis, has its origin in atherosclerosis, but sometimes follows toxic endarteritis, known as secondary arteriosclerosis. Most commonly, however, the atherosclerosis is acting alone and with a comparatively low blood pressure, but when increased blood pressure is added, evidences of nephritis may appear with retinal signs characteristic of a renal break. The arteriosclerosis of the atheromatous type is, as far as we know, a primary disease of the arteries, and is not dependent on inflammation of any particular organ, or on toxemias. It is the most common type of arteriosclerosis found among the insane, and often results in apoplexy, or other disturbances of the central nervous system.

In a recent article by Woltman it is said that the average blood pressure of 64.4 per cent. of patients with cerebrospinal arteriosclerosis observed by him was 130 mm. systolic and 78 mm. diastolic. The highest pressure noted in his series was 260 mm. systolic and 150 mm. diastolic. He says that practically normal blood pressures are shown in patients with arteriosclerosis of the nervous system.

HYPERPIESIA AND MALIGNANT HYPERTENSION.

That increased arterial tension may produce changes in the retinal vessels, indicative of its presence, was suggested by Gunn in his first communication from which I have quoted. The association of increased arterial tension with cardiovascular and renal disease is so common that it is not as yet fully accepted that a person may have long continued hypertension without some nephritis, particularly if the diastolic blood pressure maintains a high level. It has also been questioned whether hypertension can produce arteriosclerosis independent of other causes, and so far as I know we are not yet in a position positively to conclude that such is the case. It would seem, however, to be well established that the degree of hypertension is independent of the degree of peripheral arteriosclerosis, and of the amount of kidney damage present in a single case, and the evidence is becoming more abundant and more conclusive that increased arterial tension does produce a change in the walls of the arteries which, for the present at least, may be considered arteriosclerosis, and that the organic changes which are found in the vessels of the retina are produced by this tension. Ritchie describes the progress of the disease as follows: "In its earliest stages essential hypertension is not associated with any structural vascular change, but as the disease progresses, a diffuse arteriosclerosis of the smaller arteries and especially of the arterioles makes its appearance. The high pressure becomes inveterate, the larger vessels eventually become affected and the heart is found to be hypertrophied."

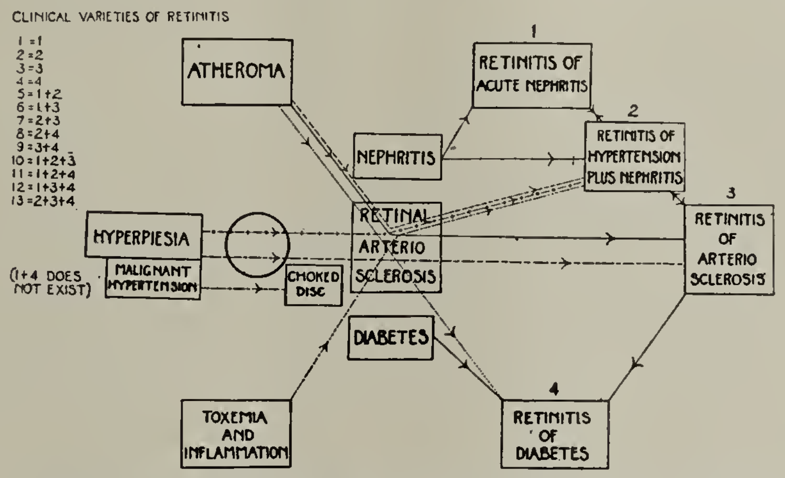

FIG. 1.—Diagram showing division of clinical varieties of retinitis associated with arteriosclerosis. The circle indicates the relative position of the retinal condition in which can be recognized evidences of increased arterial tension.

In discussing the causes underlying high blood pressure Barker says, "It seems to me very certain that sclerosis of the arterial system, other than that involving the minute arterioles at the precapillary barrier, has but little, if anything, to do with the production of high blood pressure. And there is some reason to believe, also, that even the sclerosis of the arterioles of small organs may be secondary to high blood pressure, or to what causes it, rather than that the increase in blood pressure is the result of arteriolar sclerosis. Once a high blood pressure has been maintained for a time and arteriolar sclerosis has begun, a vicious circle may be formed, the arterial hypertension favoring the progress of arteriolar sclerosis, and, the arteriolar sclerosis helping to maintain, to increase, and to 'set' the arterial hypertension." Wherever there is a multiplicity of causes working toward a given end, the task of sifting them out and according each its proper place and sequence is difficult. Arterial hypertension is caused by, or is associated with, a great variety of physical and chemical processes, some of which can be detected and their force measured, while others are believed to be active although evidence of their existence is lacking in the majority of instances.

Foster says, "there are two main factors in operation in producing elevation in blood pressure of all types. The factors are, first, increased peripheral resistance dependent on vasoconstriction induced primarily through the central nervous system. The second factor is increased heart output. . . . When the systolic and diastolic pressure are both elevated, we have a combination of two factors, increased heart output and a narrowing of the peripheral field of circulation due to vasomotor influences."

The hypertension that comes with nephritis has been ascribed to various toxic substances which are presumed to act directly on the epithelium of the kidney, on the vascular endothelium, and on the retina; and to toxic substances that normally are eliminated by the kidney, but which, under circumstances that lead to lowered functional activity in the kidney, are retained in the blood stream, resulting either directly or indirectly in a change in the fundus. When this retention of toxic substances, which are usually estimated in terms of nitrogen, is associated with rise of blood pressure, the condition is created which by the French is termed azotemia, and according to the views of Rochon-Duvigneaud is directly responsible for the inflammatory changes in the retina in albuminuric retinitis. This explanation is emphatically denied by Schiech and Volhard, who ascribe the changes to the rise of blood pressure alone. That toxic substances from other sources also give rise to increased arterial tension is shown by "an accumulation of experimental evidence on the influence of certain nitrogenous products of decomposition in raising blood pressure. Dixon and Taylor, in 1907, found an extract of placental tissue an active principle that caused a rise in blood pressure due to contraction of arterioles. Rosenheim, in 1909, showed that the pressor effect was due to P - hydroxyphenylethylamine. About the same time Barger and Dale, in 1909, showed that this substance was the chief body concerned in the pressor effect that could be obtained from an extract of putrid meat. It is derived from tyrosine by anaerobic disintegration. Several other amines which exert a pressor influence have been described by Barger and Dale, 1910. It has been shown by Dale and Dixon, 1909, that some, at least, of these amines can be absorbed from the alimentary canal and produce pressor effects when so administered. The possibility of these pressor substances arising by means other than bacterial action has been shown by Emerson, 1902, who found a pressor substance in the autolysis of pancreas under conditions that excluded putrefaction, and by Langstein, 1902, who obtained the same body in prolonged peptic digestion of egg albumen. The results of these investigations show that certain amines which exert a pressor influence may originate in the intestine and be absorbed to the blood stream. They also suggest the possibility of certain nitrogenous substances with a pressor influence arising in the tissues as a result of perverted or incomplete metabolism of protein."

Endocrine disorders are common among persons with arterial hypertension, but what the relations of these disorders of the thyroid, hypophysis, suprarenals, and gonads to hypertension are, if there be any, remains to be determined. Barker concludes that, 1, high blood pressure appears to depend chiefly on a narrowing of the lumina of the arterioles in the precapillary areas; 2, the arteriolar narrowing is at first functional, due to hypertonus of the arteriolar musculature, though later it is also partly organic, due to arteriolar sclerosis, and, 3, the different types of chronic arterial hypertension would seem to be closely related to one another, probably representing different stages in the development of one and the same fundamental process, a process that may, however advance with variable rapidity and with variable associated involvements of cardiovascular, renal, cerebral and other structures in different cases. A marked arterial hypertension probably does not continue long without becoming complicated by structural changes in the various organs of the body, most often the heart, kidneys, and central nervous system. The damage to the kidneys, however, is often small in severe cases of hypertension. Just what part the kidneys play in a case of malignant hypertension is sometimes difficult to estimate, but the low blood urea findings would hardly support the theory that nitrogenous products are responsible for the changes seen in the retina.

Of twenty-five unselected cases of malignant hypertension in the Mayo Clinic, edema of the optic nerve was seen in nine, ranging from one diopter to seven diopters. The appearance of the disc in the early stages of the change, was characteristic of intracranial pressure, and did not show changes characteristic of nephritis until after signs were found in the urine and blood. The average systolic pressure was 230 mm., the average diastolic 141 mm., the phenolsulphonephthalein excretion was good (the lowest on admission was twenty per cent. in two hours and fifteen minutes) and the blood urea was below 50 mg. for each 100 c. c. Symptoms which could be attributed to the hypertension had been present for as long as seven years, the average was two years, and the shortest period was six weeks. I will not consider malignant hypertension at this time, but merely direct attention to the possibility of great changes occurring in the fundus, with grave prognosis, in patients whose kidney function is good and whose blood analysis gives no reason for apprehension. Hardy advises against decompression for the relief of the papilledema. Experiments conducted by Hunter, Gilbert, and Hewlett showed that animals die only when very large doses of urea are given, and the high blood urea of persons suffering from intestinal obstruction, who never show changes in the eye grounds, lends doubt to the theory that retention of nitrogen is responsible for the retinal changes.

Hypertension may exist for years without giving rise to thickening of the arterial walls, that is detectable by palpating the radial or brachial vessels. The early arteriosclerotic changes are to be found in the arterioles of the retina and are quite visible with the ophthalmoscope. Ritchie says, "From the involutionary type of arteriosclerosis it differs in site, character, extent, progress and prognosis; from chronic interstitial nephritis it differs, largely in prognosis, symptomatology and mode of termination. But while drawing these distinctions between involutionary arteriosclerosis and essential hypertension and between essential hypertension and chronic Bright's disease, I would add that there are many cases in which involutionary disease becomes engrafted on hypertensive arteriosclerosis, and many cases of the latter in which the terminal stages present more or less unequivocal indications of superimposed chronic renal disorder, while in most, if not in all, longstanding cases, arteriosclerotic changes occur in the kidneys, though the characteristic symptoms of chronic interstitial nephritis are absent."

There is a type of vascular disease that must be mentioned in considering arteriosclerosis, and this is the end result of chronic endarteritis from infections such as syphilis, tuberculosis, and intermittent infections. The metastatic infection that results from foci of infection around the teeth and tonsils probably acts in two ways: directly on the vessel walls (embolism of the vasovasorum) and indirectly through disease of the kidneys and heart. The differentiation of the activities of toxemia and inflammation must be largely academic, inasmuch as hypertension is so common in the resulting diseases, but the two conditions must be set aside in order that essential hypertension as a factor in the production of arteriosclerosis will stand out more clearly. In the presence of vascular degeneration, Nature attempts to repair the damaged vessel and a thickened and changed wall results.

Pathological studies of the early vascular changes occurring in sclerosis of the retinal arteries are difficult to secure for the obvious reason that suitable eyes are seldom available. Furthermore, there are technical difficulties that must be overcome in the preparation of the material for study. The late stages of arteriosclerosis are well known and easily recognized; but the early change, which is so often brought first to the oculist, and which must be studied clinically by the physician, merits closer attention.

As I have mentioned, the basic ophthalmoscopic picture in diseases of the cardiovascular system is the structural appearance of the arteries. I have described this appearance in reference to the main groups of the disease.

In the sclerosis of hypertension, the proliferation of the intima seldom amounts to complete occlusion of the lumen of the vessel as it often does in the atheromatous type of sclerosis. The thickening of the walls because of hypertrophy outside the lamina elastica gives the tubelike appearance to the artery and accounts for the straightening of the bends. There is more elasticity to an artery so thickened than there is to one of the atheromatous type, which accounts for the difference in the angle of the arteriovenous crossing. Proliferation of new vessels, characteristic of atherosclerosis, comes as a result of the closing off of the lumen of the artery, and widening of smaller arterioles and capillaries until they carry sufficient blood for nourishment of the parts of the retina impoverished by the shutting off of the regular source of supply. So, too, one sees few or no ischemic areas in the fundus in the early sclerosis of hypertension, the visual function is not seriously impaired as far as can be seen in the visual fields, and entire occlusion of the arterioles with formation of new arteries is very seldom seen. Furthermore, the white plaques around the second and third divisions of the arteries and in the retina around the region of the disc and macula are not a part of this picture except in late stages in which the sclerosis has become far advanced.

The retinal signs of hypertension sclerosis in the order of their appearance may be divided into two stages: 1, narrowing of the arterial reflex stripe and increased tortuosity of the arteries, loss of transparency of the walls of the arteries, giving a copper color, and indentation of the veins which are crossed closely by arteries, and, 2, noticeable contraction of the arteries both in diameter and length (straightening out of curves and bends), deep indentation of the veins of small arterioles, due to their contraction, appearance of minute white spots in the fundus scattered around the macular region without any particular reference to arterial endings, and veins two or three times the diameter of the corresponding artery, and showing ampullaform dilatation distal to the arteriovenous crossing.

This constitutes the picture that is seen in persons who have progressive hypertension before any clinical or laboratory evidence of nephritis is found; these symptoms may continue for many years without noticeable change in renal function, or, as has been stated by Gull and Sutton, with "kidneys healthy, whilst heart much hypertrophied and minute arteries and capillaries much thickened by 'hyalin-fibroid' substance."

To the picture of retinal vascular fibrosis may be added other changes that indicate the effect of renal disease; but the retinitis that occurs with insufficiency of renal activity gives no indication of the duration of diseases of the kidneys before the onset of retinitis. Insufficiency of renal action or retention of nitrogenous products, although results of nephritis, probably do not in themselves produce the retinal changes. Just how much of the retinal picture results from vascular changes and how much from retention of nitrogen is not known. Indeed, in some cases it would seem that the vascular disorders alone produce the retinitis, while in others the products of retention seem to act in the absence of vascular changes producing a retinitis characteristic of nephritis. Acute nephritis may occur in a person who has had essential hypertension for years and be independent of the cause or effect of that hypertension, and may produce a retinitis of acute nephritis, even as in a person whose retinas had previously been free from vascular change. The retinitis would be produced just as in a person whose blood pressure is not habitually elevated, although its course will be altered by chronic hypertension. More particularly is this true of persons whose arteries have become sclerosed through long continued hypertension. "To the arteriosclerosis of hyperpiesia, the kidneys, so far as is yet known, stand in no correlation; except that generally speaking, the kidney is one of the organs whose arteries are affected early."

It is a common clinical experience that persons who are subject to high blood pressure are prone to have attacks of nephritis against which their resistance is poor. Because of the difficulty in making a satisfactory diagnosis of nephritis, it is often difficult to decide whether a given patient is suffering from essential hypertension or hypertension with nephritis. Curiously enough, the retinal arteries may show well advanced fibrosis resulting from hypertension, and yet retinitis of nephritis be absent in cases in which laboratory findings and clinical signs may indicate the presence of chronic nephritis. It is well known, however, that a severe break in renal function in a person who has hypertension will produce marked changes in the fundus, characteristic of acute nephritis, in addition to the vascular fibrosis. The picture is a composite one. The earliest noticeable additional changes consist of edema and hyperemia of the disc and flame-shaped or lanceolate hemorrhages in the retina near the disc. Following these, edema of the retina and areas of soft cotton wool exudate appear. If the blood pressure suddenly becomes greatly elevated, as usually happens with a break in renal function, the hemorrhages, edema, and exudate will be correspondingly increased.

The chemical changes that occur in the fluids of the eye during the progress of the disease of the kidney and other conditions that lead to, or are associated with, arterial hypertension have been suggested as a fruitful field of investigation, and it is probable that with carefully observed and controlled cases such a study would throw some light on the nature and cause of the exudates and hemorrhages to be found in the retina, the cause of vitreous degeneration and of opacities in the lens. To carry out such studies satisfactorily requires good laboratory facilities and frequent tests which require technical skill, besides observation of patients under circumstances that will allow full control of fluid intake and food.

Focal infection is known to play an important part in the production of organic disease, particularly of the kidney, and its relationship to hypertension must be considered. Just what part focal infection plays in primary sclerosis of the vascular system has yet to be worked out, but it is quite certain that patients under treatment for vascular disease improve after infected areas have been eradicated.

A great deal can be accomplished by treating patients who have early hypertension before the vessels are materially thickened, or the kidneys or heart severely damaged. After considerable change has taken place in the retina, the evidences of arteriosclerosis and of retinitis may almost entirely disappear if the general condition can be improved and the blood pressure kept down. Compensated hypertension in a person of middle age may be carried for years without any sign of sclerosis appearing in the fundus, but that is an exceptional case. When sclerosis appears, it usually marks the beginning of secondary or complicating diseases, and unless the tension is lowered, the sclerosis lowers the resistance to disease. It is important that the early signs be detected and interpreted, and I know of no better means than that afforded by repeated examination of the fundus with the ophthalmoscope.

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Subacute Bacterial Endocarditis*

By JOSEPH BARSKY, M. D.,
New York,
Attending Physician to Beth Israel Hospital.

The presentation of a paper on the diagnosis and clinical course of subacute bacterial endocarditis with reports of cases from Beth Israel Hospital needs no apology. So rarely are these cases recognized that not a single one has been reported under this heading to the Bureau of Records within the past ten years. The Board of Health records give 4,839 deaths caused by either acute or chronic endocarditis in the same period, and 217 cases with the endocarditis as a contributary cause of death. This is, therefore, in itself good reason for presenting this paper with the prime purpose of bringing to your attention a class of cases which is not as rare as is commonly believed.

I would like to emphasize the importance of recognizing these cases from the prognostic viewpoint. While they almost all appear mild and innocent at the onset, the termination is quite different, death being the rule. The physician seeing such a case at the onset is much too prone to give a good prognosis and promise a speedy recovery, but the contrary is the truth. Such optimism on the part of a physician is never forgiven nor forgotten by the friends or relatives of the patient. That we may guard ourselves against such optimism is one of the reasons for this paper.

I shall endeavor briefly to describe the more common symptoms of this disease as they are usually encountered in the majority of cases in private practice, as well as in the hospital. I shall also point out the difficulties (and they are unquestionably many) which interfere with the recognition of this malady.

The symptomatology as described in this paper is based upon a study of thirty-eight cases in the wards of Beth Israel Hospital and twelve cases seen in my private practice. I wish to state at the very outset that the salient features herein described relate to my series of cases only, and that not every case presents all the symptoms. Nor can it be said that the symptoms enumerated are the only ones which may be present. I am giving only those observed by me and from the records of these cases.

DEFINITION.

Subacute bacterial endocarditis is a chronic progressive generalized bacteriemia, lasting usually from two months to as many years and terminating, as a rule, fatally.

CAUSATIVE AGENT.

The causative agent is, in ninety-five per cent. of the cases, the Streptococcus anhemolyticus. It usually localizes upon rheumatic, sclerotic or syphilitic valves, and occasionally in healthy hearts. In this series, four patients had normal hearts.

MODE OF INVASION.

The mode of invasion of the organism is as varied as is the symptomatology. This organism is found in all infected teeth, tonsils, sinuses, and occasionally in the intestinal tract. Any or all of these sites serve as the gateway for entrance into the body at any time that the resistance of the individual is lowered, from any cause whatsoever. The original point of infection is not, as a rule, found, and this will exclude all cases wherein the focus of infection is evident, such as puerperal sepsis, which may be caused by the same organism.

INCIDENCE.

Male, fourteen; female, twenty-four. The youngest on record in my series is one year, a case previously reported by Dr. Francis Huber (1). This case presented all the typical signs and symptoms of the disease. With the possible exception of a case reported by Dr. Coutley, my own is, as far as I know, the youngest on record. The oldest was aged sixty-five.

PATHOLOGY.

The gross pathological findings are quite distinctive. If the patient lives long enough, there are infarcts and minute bacterial emboli in most of the organs, such as kidney, spleen, lungs and brain. There are firm yellowish or greenish vegetations on the line of closure of the mitral valve extending into the auricles and the chordæ tendineæ. Occasionally the aortic valves are involved. Ulceration is rare, The Streptococcus anhemolyticus could be cultivated from the vegetations in many cases.

There are several theories given to account for the selective localization of the bacteria. Mechanical considerations point to an interesting possibility—that the beating of the valves traps the bacteria from the blood streams and drives them into the tissue. Thus the bacteria become entangled and produce the lesion. Chemical damage to the valve may assist the process. Another theory, revived by Rosenow, is that the bacteria come to the valve as emboli by way of capillary bloodvessels. However, according to Coen and Langer, the heart valves contain no capillaries except at the base. Rosenow bases this argument upon the experimental production of bacterial endocarditis by the injection of streptococci into the blood stream. This experiment, however, sheds no light upon the cause of the selective localization of the bacteria. Personally, I am inclined to favor the mechanical theory.

SYMPTOMATOLOGY.

The most important feature in the diagnosis is a good, careful history, which necessitates close attention to all the complaints of the patient, no matter how trivial they may seem.

The onset of this disease, whether upon a previously healthy heart, or upon a rheumatic, sclerotic or syphilitic valve, is, as a rule, insidious. The patient does not realize that he has been sick for any length of time. Indeed, in a number of cases, the onset is so gradual that the patient cannot fix a definite time for the beginning of his illness. Upon close and careful questioning we may bring out the fact that a feeling of fatigue was more marked than usual after an ordinary day's work. Occasional chilly sensations and irritability were experienced by some, and the patient thought that he was suffering from grippe. Indeed, physicians often diagnose such cases as grippe, put the patient to bed, and in a few days allow him to go about his daily tasks. So gradual and insidious is the onset that patients go about for weeks and months unaware that they are suffering from this most treacherous and, as a rule, fatal disease, for sooner or later, with but a few exceptions, all succumb.

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*Paper read before the Eastern Medical Society, October 14, 1921.

Pain, in some part of the body, is mentioned by some observers as the first complaint. I have had two or three cases in which the chief complaint was pain. One case presented severe pain in the knee joints, and was unable to support the body in an erect posture. The second patient complained of pain in the right thigh and was so sensitive to pressure that she would cry out at the slightest touch. The pain suggested the possibility of a periostitis. In both these cases I was able to elicit a history of trauma which had occurred a long time ago, and was almost forgotten by the patient. The best explanation that I can offer for the pain in these cases is that the trauma has lessened the resistance of those particular structures which, therefore, were hypersensitive in their reaction to the toxic substances circulating in the blood. Furthermore, there was the possibility of an actual lesion in these cases, such as a periostitis in one and a fibromyositis in the other.

Dizziness is another presenting symptom which is not rare. I remember the case of a boy aged sixteen who awoke in the middle of the night and became so dizzy that he could not find his way back to bed unassisted. When I saw him the following morning, he was more or less dazed, and could not give a good account of himself. He was removed to the Beth Israel Hospital where subsequently a typical case of subacute bacterial endocarditis developed. The boy had no history of previous illness, had neither cardiac signs nor a history which would lead us to suspect such a condition. Subsequently there developed a mitral systolic, slight cardiac enlargement to the left (probably due to dilatation), petechiæ and positive blood culture. This patient made a good recovery.

Fatigue, irregular temperature, profuse sweating, irritability, anorexia, moderate loss of weight, and facial pallor may be the only symptoms even if the case is far advanced, and no other symptoms may ever appear until the termination. In the greater number of cases there appears sooner or later a distinct chill and a decided rise in temperature. The temperature, usually preceded by a chill, may rise suddenly as high as 104°, with a daily swing of three to four or even five degrees and may continue thus for weeks or months. Then it may come down to a lower level, such as 101° to 102°, with a daily swing of only one to two degrees, and remain at this level for months. We had one case, a girl of twenty, a congenital cardiac patient, in whom there developed subacute bacterial endocarditis. At times her temperature would make a daily swing of from six to eight degrees, especially after intravenous injections of colloidal salts. A violent chill always preceded the rise in temperature. I do not know how long she had been ill before her admission to the hospital, where she remained for nine months. Her constant sense of wellbeing was an outstanding feature. As soon as her chill subsided, she would ask to be allowed out of bed. She did not complain of any pain. She had typical signs with positive blood culture and autopsy findings.

I remember two patients, one of whom had a normal temperature for seven weeks, the other a normal temperature for three weeks, just before death. In the second case the entire illness was known to last fourteen months. Previous to the onset the patient had a normal heart. Not only was her temperature normal for three weeks, but the pulse was of good quality, 80 to 90 and perfectly regular. It remained regular until but a few minutes before death, when it became flickering and irregular. She had a few twitchings in the facial muscles. Before the onset of these symptoms she was in a semicomatose condition for a short time. Then with their onset she went into complete coma, and died within half an hour. Forty-eight hours previously she had had good hopes of recovery, though it was evident that dissolution was near. In her case the blood cultures were repeatedly negative.

As a rule the temperature is what may be termed regularly irregular; there is no typical curve. This in itself is an aid in diagnosis. Sweating is a very common symptom and occurs in a great proportion of cases. I have seen cases where the patients were literally drenched. I would consider the profuse perspiration which occurs even when the temperature is not very high as a prominent symptom. However, in the late epidemic of influenza I have witnessed such profuse perspiration. It also occurs in severe malarial infections and in cases of acute malignant endocarditis.

I should like to emphasize the fact that in the absence of other definite causes for such reactions as a continuous temperature, irregular in type for any length of time, chilly sensations, or distinct chills and drenching perspiration, weakness, and peculiar pallor, the possibility of subacute bacterial endocarditis should at once suggest itself. I have seen cases that showed no symptom other than those mentioned terminate fatally within six to eight months.

I particularly remember one patient who always had a sense of wellbeing. He thought his inability to work was due to the hemiplegia. Even this improved so that the patient was able to help himself considerably. He had an infection of Streptococcus anhemolyticus with a positive blood culture of more than two hundred colonies to the plate. He showed no petechiæ or other signs which we commonly associate with subacute bacterial endocarditis. Pallor, sweating, and irregular temperature were the only symptoms present. Later there developed a left sided hemiplegia which, of course, could have occured in any case of valvular disease and of itself could not be considered as a symptom of subacute bacterial endocarditis. He had no skin manifestations of any kind. His appetite was good, he slept fairly well and had a sense of wellbeing during his entire stay at the hospital. He left the hospital and died two weeks later. His main symptoms were continuous rise in temperature of an irregular type, rare chilly sensations, weakness, moderate loss of weight, drenching sweats, peculiar pallor of the face with an intensification of the pallor at the nasolabial folds. Later his spleen became palpable and he occasionally complained of pain in that region. This was probably due to infarcts.

The other signs which may be considered pathognomonic are the cutaneous phenomena, though, as I have stated above, a goodly number of cases do not present any other symptoms or signs than those I have just enumerated. These cutaneous manifestations are not essential in making a diagnosis, but if we do find them, then we are surely dealing with a case of subacute bacterial endocarditis, even if the blood culture be negative. Indeed, they are so important that it requires a good deal of courage to suggest this diagnosis in their absence. One of my cases illustrates this point very well. A man of thirty with a previously damaged valve began to experience fatigue, chilly sensations, and progressive weakness. He called in his physician, who considered it a grippal infection. After remaining in bed for a while without improvement, he was sent to a hospital for observation and seen by one of our best men, a man very familiar with this disease. The case was diagnosed by him as subacute bacterial endocarditis. The patient's condition, however, improved within a short time. The blood cultures being negative and since the temperature became normal, to all appearances he seemed well. After two weeks stay in the hospital he was sent home, his diagnosis being changed at the time of discharge. After being home for about a week he was suddenly seized with a distinct chill. When I saw him later, he had all the cutaneous phenomena, pathognomomic of this disease. As a rule these skin lesions are not very easily detected. We must look for them very carefully.

Of prime importance are the petechiæ, which are embolic in nature and not hemorrhagic. They are mostly found upon the mucous membrane of the mouth and upon the conjunctivæ. Since their description and the method of detection as given by Dr. Libman is, to my mind, the best, I quote from his lecture on subacute bacterial endocarditis as follows:

"It is important when looking for petechiæ to examine particularly the conjunctival mucous membrane of the upper and lower lids, the supraclavicular and the lateral cervical regions, the buccal membrane, and the fundus of the eye. When the lesions are found in the conjunctiva, concerning the petechial nature of which one is in doubt, it is a good plan to squeeze the lid at its margin, just as one presses on the skin to determine whether a lesion is petechial or not. If the particular conjunctival lesion is a petechia, it will stand out sharply against the anemic conjunctival mucosa. In looking for petechiæ on the buccal mucous membrane one must be careful not to mistake traumatic lesions for embolic petechiæ. One must be particularly cautious in deciding about lesions of the buccal mucosa near the labial commisures, because many people have a tendency to bite the mucous membrane and produce small hemorrhages.

". . . Petechiæ with white centres are the most vital in diagnosis, because then one can have no doubt that the lesion is an embolic one, and not a symptom of a purpuric nature. It is especially important (and this holds especially true for the conjunctival lesions) to note whether the central white part is elevated or not, because such elevation does not occur in subacute streptococcus endocarditis. Petechiæ with elevated white centres are pathognomonic of infection by staphylococci and usually by the Staphylococcus aureus. They are really miliary abscesses surrounded by a zone of hemorrhage."

Next in importance are the subcutaneous hemorrhages. These are found in most cases of septic infection arising from any cause. It should be noted here that in the final analysis we are dealing with a septicemia, caused by a peculiar organism called by some observers Streptococcus viridans and by Dr. Libman Streptococcus anhemolyticus. This organism, for some reason unknown at present, has the property of localizing upon a damaged heart valve or other parts of the endocardium. Occasionally the organism attacks a healthy endocardium, and from this central point the bacteria as well as their toxins are distributed to all parts of the body and produce symptoms which are common to all bacterial invasions. Hence we must expect to find certain phenomena which are common to all toxemias. The purpuras are one of these common signs.

Erythematous rashes of all varieties are common. I have seen cases resembling erythema nodosum. In subacute bacterial endocarditis, the individual lesions are not as large or as painful, nor is the infiltration of the skin as deep or as longstanding as the lesion in erythema nodosum. In subacute bacterial endocarditis the lesions come and go, are small in size, and are distributed over all parts of the body, usually upon the extremities. In one instance they were present upon the face, and in some cases patches were also present upon the finger pulp. These patches are usually bright red and painful, but never so painful as in erythema nodosum. When the circulation is poor, they assume a purplish tinge. There are other skin manifestations distributed over various parts of the body; these can be classed under the general heading of erythema multiforme.

TENDER NODES—OSLER'S SIGN.

Their history dates back to 1853, and they have been observed by many others since, but little attention was paid to them until Osler's paper appeared. These lesions are commonly known as tender nodes. Dr. Libman found them in about fifty per cent. of his cases. Osler's description is as follows: ". . . . They appear at intervals as small swollen areas the size of a petechia, at others as large as one and a half cm. in diameter. They are raised, red, with a whitish spot in the centre. They may pass away in a few hours, but usually last a day or longer. Their most common site is upon the tips of the fingers, which may be slightly swollen. They also occur in the pads of the fingers and toes, upon the thenar and hypothenar eminences, sides of the fingers and the skin of the lower part of the arm. In one case they occurred in the skin of the flanks.

They are never hemorrhagic. Sometimes they are of a vivid pink hue with a slightly opaque centre."

I personally have seen very few of them in my cases. Perhaps in the earlier days we did not look for them so closely, but in our later cases they were most carefully watched for by the entire staff and by Dr. Levine, our dermatologist, but we have seldom succeeded in finding them.

The face has a peculiar pallor. Peculiar is the best description that I can offer. It is not the pallor one observes in cases of secondary anemia. The pallor of subacute bacterial endocarditis is present in cases of only mild anemia; once it has been seen, the impression remains with the observer.

Cough is usually present, but it is the result of several factors, and not the result of the subacute bacterial endocarditis *per se*. Among the factors causing the cough may be mentioned pulmonary engorgement as a result of mitral stenosis or of cardiac insufficiency. The causative factor may be a complicating chronic bronchitis, which may be present even though there be a fair heart muscle. In the absence of any recognizable cardiac or pulmonary signs, the cough may be occasioned by the toxic substances circulating in the blood, or possibly by the enlarged tracheobronchial glands. The respiratory rate is governed by the same factors as mentioned and also by the temperature. Given a mild toxemia, fair heart muscle, and a slight elevation of temperature, the respiratory rate is but slightly increased. Of course, in the presence of complications such as pulmonary embolism, infarct or pneumonia, we shall have other symptoms referable to this complication.

ABDOMINAL PAIN.

Abdominal pain or referred pain is common. The pain is mostly due to infarcts of the spleen or kidneys or to small infarcts in the mesentery. The occurrence of the infarcts is followed by pain which is referred to the abdomen from the affected organ. There may also be small hemorrhages into other abdominal viscera which may cause pain. Epigastric pain may be present in other cardiac conditions, and is probably due to liver engorgement.

Diarrhea is found in a small number of cases and is exhausting. Anorexia, nausea and vomiting are present as the gastrointestinal manifestations of the toxemia or cardiac insufficiency. The spleen is, as a rule, palpable and painful, and at times greatly enlarged. Cases are reported in which an original diagnosis of Banti's disease was made. One of my patients, a woman, came to the Beth Israel Hospital for observation. She had a moderate temperature, an enlarged spleen and an old endocarditis. She caused rather a considerable discussion as to the etiology of the splenic enlargement. I suggested the possibility of subacute bacterial endocarditis. Her blood culture was negative. The Wassermann was, however, positive. Later a facial palsy developed. The clinical picture of an enlarged spleen, facial palsy, fever and a positive Wassermann, as well as her improvement under specific therapy, was all in favor of lues. To my mind she seemed a case of subacute bacterial endocarditis, although all I had to sustain my opinion was the clinical impression. This patient left the hospital apparently cured of the condition for which she entered, only to return eight months later in a semicomatose state. She died soon after. The blood cultures and the autopsy findings proved the case to be one of subacute bacterial endocarditis as well as of luetic infection.

Pain over the splenic area and in the costovertebral angles is due to infarcts, and we can often elicit tenderness in these areas upon deep pressure. In examining any patient, the spleen and kidneys should be carefully palpated, as tenderness and pain in these areas are of diagnostic import.

Pain in various parts of the body is generally complained of by some patients, and this is undoubtedly due to the toxic substances affecting the neuromuscular endings. It is probable that we may have a mild form of a peripheral neuritis, or a neuromyositis, for moderate pressure over the muscles will, in some patients, cause pain. Pain in the joints and over the long bones may also be present. In none of my cases was there a distinct swelling of a joint. Pain over the lower part of the sternum, Dr. Libman's sign, was present in a few cases only. One case that I had in mind I saw with another physician. The history given was that of progressive weakness, irregular temperature, profuse perspiration and complete anorexia. She presented the peculiar pallor, an old cardiac lesion, and pain at the lower part of the sternum. I ventured a diagnosis of subacute bacterial endocarditis, which later proved to be correct. The reason for the pain at the lower part of the sternum is not clear at present. Whatever explanation the future may offer, at present we must content ourselves with the fact that the pain is present in some cases and that it is a valuable sign.

The diagnostic signs afforded by the examination of the heart depend upon the previous condition of that organ. In cases without any previous endocardial damage we may not discover any adventitious cardiac sounds. In one case which had a stormy onset, a severe course, in which the patient eventually recovered, I found, early, a soft blowing mitral systolic murmur with an enlargement to the left. The enlargement was probably due to dilatation. In a second case, which ran a moderately severe course and where the patient recovered after about four months' stay in the hospital, there developed, much later in the disease, a mitral systolic murmur. He still has this murmur, but is otherwise well, although slightly neurotic. The patient had a positive blood culture.

The examination of the heart itself does not throw light upon the diagnosis of the disease. The cardiac condition is not especially marked until late in the course. The aggravation may be either mechanical or due to the exhaustion as a result of the toxemia. All other phenomena are vascular, such as embolisms and infarcts in various parts of the body. Embolic aneurysm may also occur, although I have not seen it, but a number of cases have been reported in the literature. One very interesting case with autopsy findings was reported by Dr. Libman. Embolic complications are more common in this disease than in any other, and should be looked for carefully, as they furnish valuable information.

A whole chapter could be written upon the symptomatology produced by the emboli and infarcts, but neither time nor space permit. The symptoms of these complications depend upon their location. The spleen, brain, and kidneys are the common sites of choice, but any other part of the body may be affected. Traces of blood, faint traces of albumin and casts are usually found in the urine, due to infarction of the kidneys, but I do not remember seeing a true nephritis. Edema may be present, depending upon cardiac efficiency. I have on record a case in which edema was present, although the heart seemed to be in good condition, as far as could be determined by physical and instrumental examinations. In this case the renal efficiency was good, as shown by the phenolphthalein tests and by blood chemistry. Effusion into the various serous cavities may be present, and there also may be cardiac decompensation with little or no edema. Edemas in cardiac diseases require more lucidation. No adequate explanation has as yet been given as to why in some cases of cardiac decompensation we may have general anasarca, in other cases we may have effusion into the serous cavities, in still other cases effusion into one pleural cavity only, and in a fourth class we may have liver enlargement only with but little edema.

The pulse is, as a rule, regular, if the previous cardiac condition was such as not to impair its regularity. It may, as we would expect, be somewhat increased in rate, depending upon the temperature and toxemia.

The physical examination of the cardiovascular system, including the use of the electrocardiograph and pulse tracings, does not offer any further diagnostic data.

The genitourinary system is, as a rule, involved, due to congestion of the kidneys from the cardiac asthenia and from the effect of the toxemia and infarcts. In the latter event we have a greater or less amount of blood in the urine, pain in the renal area radiating along the course of the ureter of the affected side toward the bladder.

LABORATORY FINDINGS.

Laboratory findings do not assist us in the diagnosis of these cases unless it be a positive blood culture of Streptococcus anhemolyticus.

Blood examination may give us from a mild secondary anemia to a severe form, presenting from 3,000,000 red cells and fifty per cent. hemoglobin to about 1,500,000 red cells and thirty per cent. hemoglobin. Our lowest leucocyte count was 5,000; our highest 48,000. This latter was of a patient who had a negative blood culture, but who was clinically a case of subacute bacterial endocarditis. The differential counts did not present any distinctive features.

The urine examination showed from faint traces of albumin to definite traces of albumin with a small number of casts. The urine also showed from a moderate amount of blood to grossly bloody urine. We had one case in the hospital in which the patient passed almost pure blood and clots for about three or four days. She had excruciating pain with tenesmus. Only a short time prior to this complication the functional activity of her kidneys was fair. The blood chemistry was not remarkable.

THE COURSE OF SUBACUTE BACTERIAL ENDOCARDITIS.

This disease may run a course which lasts anywhere from two months to two years. The longest duration amongst my series was fourteen months, the shortest about three weeks. The prolonged case presents a most varied symptomatology. The onset may be very severe, with chills, high temperature, profuse perspiration, exhaustion, a marked secondary anemia, pallor and infarcts of the spleen, kidneys or brain. Other cases may show nothing except a slight continous temperature, a palpable spleen and if the patient is not of a chronic valvular type a physical examination may show only a faint mitral systolic murmur with possible slight enlargement to the left.

This disease may last for months and as the patient becomes bacteria free, the temperature may subside. Both patient and physician are then lulled into a sense of security at having passed through the dangers safely with the port of rest and recovery in sight. Soon this feeling is rudely destroyed and another voyage is begun which practically always continues into the sea of the great unknown. In my series, I have had two recoveries of undoubted cases of subacute bacterial endocarditis.

As the disease progresses to its fatal termination, the patient becomes weaker and the exhaustion is profound. The marked asthenia is a result of both the anemia and the toxemia. Anorexia is complete, the patient refusing all food and vomiting when forced to eat. Apathy or drowsiness may be followed by a semistuporous condition or complete coma. The pulse becomes weaker, small, irregular and hardly perceptible. The respirations assume the Cheyne-Stoke's type although the temperature may be normal, the patient expires with symptoms resembling either cerebral insult or renal insufficiency. This mode of exodus is not the rule. Nature is more merciful and brings in some form of intercurrent infection, usually a pneumonia which is terminal. If this does not occur, death ensues as a result of embolism or infarct in a vital part of the body, thus bringing down the final curtain upon one of the most distressing scenes which the practitioner is called upon to witness.

DIFFERENTIAL DIAGNOSIS.

The first prerequisite for making a diagnosis of the disease under consideration is to bear in mind the possibility of this illness in all cases of prolonged fever, irregular in type, progressive weakness, mild anemia, pallor of the face, chilly sensations, palpable spleen, profuse perspiration, and periods of improvement which may last for a shorter or longer period, especially in cases where there are signs of chronic endocarditis. The symptoms given above and pain in the different parts of the body, especially at the lower part of the sternum, should at once make us suspect subacute bacterial endocarditis. A blood culture should be taken and of course if positive no other disease need be considered, but if negative we should consider all the causes of prolonged fever.

SUBACUTE RHEUMATISM WITH FEVER.

Subacute rheumatism with fever and valvular involvement will give us much concern and will offer the greatest difficulty. In this connection it must be borne in mind that no hard and fast rule can be laid down for the differentiation of these two diseases. They are both unquestionably of bacterial origin. Their symptomatology may not differ in many cases and the difference between the two diseases is rather of degree than of kind. At times the differentiation is impossible until late in their course. The prognosis in the two cases is vastly different and of utmost importance from the viewpoint of the ultimate result as well as of diagnostic skill. In subacute bacterial endocarditis the prognosis is generally fatal, but in subacute rheumatism the prognosis is good as far as immediate recovery is concerned. In differentiating these two diseases we must rely upon a careful history and centre our attention especially on the mode of onset and later on the complications. In subacute rheumatism with fever we have a history of a very acute onset with high fever at times, though very seldom, preceded by a chill, great prostration and symptoms of an acute arthritis either simultaneously involving several large joints or single joints following one after the other with the usual symptoms, such as swelling, redness, severe pain on moving the joint, and increased heat. The indirect evidence may be that we either find a pericarditis or a history of severe pain over the precordium. Effusion into the pleural cavity is not rare. The pericarditis and the pleural effusion may be considered either as a complication or a part of the rheumatic infection. The spleen is not palpable in subacute rheumatism, neither is the peculiar pallor present.

In subacute bacterial endocarditis the onset is gradual, the patient cannot give a definite time for the beginning of the illness and although he may complain of pain in some part of the body, and even in the joints, nevertheless the signs and symptoms of an acute arthritis are lacking. Nor does pericarditis or the pleural effusion form any part of the subacute bacterial endocarditis unless it be as a sequence to some complication. In a word, in subacute bacterial endocarditis the onset is gradual, the spleen is always palpable, the peculiar pallor is always present, the skin manifestations are of an embolic nature, and in a good many cases pain is present over the lower part of the sternum.

TYPHOID FEVER.

In considering the cases of prolonged fevers, typhoid, especially the relapsing type, will suggest itself as a first possibility. In fact, if our case of subacute bacterial endocarditis occurs in a patient free from previous endocardial involvement, the chances are that our first diagnosis will be typhoid. We shall have great difficulty in ruling it out for the onset in both classes of cases may be similar.

The symptoms, such as progressive weakness, loss of weight, secondary anemia, asthenia, prolonged fever of an irregular type and a palpable spleen, all of which are common to all bacterial infections, are also common to both diseases. A few points, however, may help us to differentiate the two. We must rely upon our laboratory findings a great deal. In typhoid we always have a leucopenia, complement fixation and Widal positive, typhoid bacilli in the blood, if early in the disease, and in the urine and feces later in its course.

Abdominal symptoms, complications and sequelæ are quite different in typhoid. The skin manifestations, if present, are unlike those seen in subacute bacterial endocarditis. The peculiar pallor is absent. Vascular changes are rare in typhoid but are a part of the evolution of subacute bacterial endocarditis. Lastly, endocardial symptoms are present only rarely in typhoid but are always present in subacute bacterial endocarditis.

TUBERCULOSIS.

To rule out tuberculosis anywhere in the body will indeed be difficult in such cases of suspected subacute bacterial endocarditis with no skin manifestations, negative blood culture and only presenting symptoms of irregular temperature, sweats, secondary anemia, progressive weakness and loss of weight. Surely from these symptoms alone a diagnosis of tuberculosis will naturally suggest itself, and the only way that I know to rule this out is by a thorough, painstaking, oft repeated physical examination. Examination of sputa and urine for tubercle bacilli and animal inoculation, a thorough x ray study of the chest, and possibly a complement fixation for the organism may aid us. The autourine test of Wildbolz for active tuberculosis should also be utilized.

HODGKIN'S DISEASE.

Hodgkin's disease involving the retroperitoneal glands and showing a moderate fever, mild secondary anemia, progressive weakness, and abdominal pains with gastric symptoms such as nausea and vomiting will certainly offer great difficulty in making a differential diagnosis. Nevertheless, in Hodgkin's disease a close study of the pains in the abdomen will disclose that they do not have the characteristics of the pains in subacute bacterial endocarditis, since in the latter disease the pains usually originate in the spleen or kidney (due to infarcts), come suddenly and disappear slowly. The pains have their characteristic radiation towards the bladder (if originating in the kidneys) and they usually subside after the acute onset and may reappear whenever there are fresh infarcts. In Hodgkin's disease with involvement of the retroperitoneal glands the pain is constant, there is pain in the back as well, the radiation being totally different. Lastly. in Hodgkin's disease, the pain will seldom remain confined to one group. There is, as a rule, a leucopenia and at times a slight increase in the eosinophiles. Jaundice, ascites and swelling of the lower limbs (not due to circulatory disturbances but to pressure) may be present.

PYELITIS.

Pyelitis will come in for a good share of the discussion, especially when it is remembered that in subacute bacterial endocarditis we have renal symptoms such as pain, urgency, frequency, blood, albumin and a few casts in the urine due to infarcts. Moreover the two conditions may coexist. The differentiation here is more than an academic question. In pyelitis, most commonly due to calculus, we may save our patient by timely intervention, whereas in the presence of subacute bacterial endocarditis we are helpless in most instances. All modern methods employed in the study of impaired renal function should be utilized, namely, cystoscopy, x ray with ureteral catheters *in situ,* collargol injection and x ray for kidney outline and calculus. Separate functional tests for renal excretion, culture of the urine, animal inoculation and blood chemistry should also be done. Lastly, if after all our efforts we are still in doubt, I personally am in favor of surgical intervention if the patient's general condition permits. We have nothing to lose, and if our suspicions are confirmed we may save our patient's life.

SPLENIC ANEMIA.

Only the beginning or the first stages of splenic anemia need be considered here, for in its later development we have a distinct clinical picture which is very unlike subacute bacterial endocarditis. In the beginning, the only symptoms that we may encounter that are common to both diseases are splenic enlargement and moderate fever. In splenic anemia, the leucopenia is an outstanding feature, the white cells numbering as low as one to three thousand, with a relative lymphocytosis. As a rule, there is no anemia at the outset. Hemorrhages from the esophagus and other parts may be present. A totally different picture presents itself in subacute bacterial endocarditis. Malaria of the irregular type I mention as a possibility. It can easily be ruled out by a blood examination for the plasmodia. Such examinations should be repeatedly done.

In closing, I should like to mention cases of meningococcus septicemia without meningeal involvement until late in the disease. Such cases have been reported by Dr. H. J. Morgan, of Johns Hopkins. These cases run a course similar to subacute bacterial endocarditis. In the cases of meningococcus septicemia reported, blood culture was always positive for the meningococcus.

The following cases have been chosen from my service at Beth Israel Hospital, as representing fairly typical examples of the course of the disease.

CASE I.—R. D., female, aged twenty-five. Admitted to Beth Israel Hospital January 19, 1915.

Family history—Father had socalled rheumatism, otherwise negative.

Previous history—Married eight years, four pregnancies, three stillbirths, one child died in infancy, deserted by husband three years ago, frequent attacks of precordial distress, palpitation and dyspnea since age of fifteen; typhoid at sixteen; pneumonia three years ago, frequent colds.

Present illness—Confined to bed for last four months with weakness, frequent attacks of palpitation, headaches, dizziness, nausea, vomiting, and severe productive cough. Seven days ago there suddenly developed fever, chill, sweats, paroxysmal cough, dyspnea and pain in right chest; appetite lost.

Physical examination—Fairly well nourished young woman, prostrated, markedly dyspneic and cyanotic. Sibilant and sonorous râles throughout the lungs. Apex beat was felt in fourth interspace four and one half inches; to left of midsternal line. The first sound was followed by a short systolic murmur transmitted to the axilla. There was a rough loud systolic murmur at the base, heard all over the precordium and transmitted into the vessels of the neck. The abdomen was slightly distended, liver felt at costal margin, spleen and kidneys were not palpable. Slight pretibial edema, clubbing and cyanosis of finger tips. Reflexes normal.

Laboratory—Urine (fifty-seven examinations), specific gravity 1.015-1.030; dark amber; acid, albumin, faint trace; no casts; few red and white blood cells; guaiac positive at last few examinations. Blood (twenty-five examinations), red blood cells, 5,200,000-3,300,000; hemoglobin, 80-60 per cent.; white blood cells, 5,200-12,400; polymorphonuclear, 66-81 per cent.; mononuclear, 34-19 per cent. Wassermann negative, Widal negative, eye culture negative, urine culture negative, nose and throat cultures negative; blood culture, first seven negative; eighth, Streptococcus viridans. X ray, left pleural effusion; heart considerably enlarged. Marked evidence of periostitis of bones of elbow joint.

Course—During the nine months that intervened between this patient's admission to the hospital and her death, she ran a septic temperature between 98° and 104° except for a period of six weeks later in her illness, when it was practically flat. She had many crops of petechiæ, urticarial wheals, and severe attacks of dyspnea following injections of colloidal salts; attacks of pain in the splenic and lumber regions; occasional hemoptyses; transient edemas, and large collections of purpuric spots. Frequent chills and constant loss of weight. Towards death her temperature was frequently subnormal, reaching as low as 93° and 94° F.

CASE II.—J. S., male, aged twenty-five. Admitted to Beth Israel Hospital September 7, 1915.

Family history—Negative.

Previous history—Scarlet fever; typhoid; gonorrhea three years ago; no rheumatism, no tonsillitis, no cardiac symptoms. Had always been well.

Present illness—Onset gradual six days before admission with lumbar pain and sore throat. He was in hospital for two days, and left feeling well; next day had mild chill followed by profuse perspiration. Return of lumbar pain, temperature markedly elevated. No headache or epistaxis.

Physical examination—Well developed and nourished, no dyspnea or cyanosis, throat slightly congested, left tonsil enlarged, lungs clear; heart, no enlargement to percussion, no thrills or murmurs, sounds of fair quality. Abdomen, no palpable viscera, no pathological reflexes, extremities negative.

Course—Ran a septic temperature 98-99° in the morning, rising to 104° in the evening for a period of eight weeks. Pulse relatively slow. Shortly after admission an occasional localized systolic murmur was heard at the apex; this later became permanent and was transmitted. Dull pain in left lumbar region, spleen felt two fingers below costal margin. There were no petechiæ at any time. The temperature gradually fell and patient was discharged eleven weeks after admission.

I am indebted to Dr. Solon S. Bernstein for his aid in the preparation of this paper.

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Hypertension with Especial Reference to Prognosis

By JOSEPHUS TUCKER ULLOM, M.D.,
Philadelphia, Pa.

With the advent of the blood pressure apparatus, the medical profession has looked at an old disease from a new angle and has been able to measure the pressure in the arterial system more accurately. Before the introduction of the sphygmomanometer, reliance was placed on the palpating finger and the stethoscope; and there was the high tension pulse and the accentuated or ringing aortic sound, but a standard for comparison was lacking, and as must always be the case without an instrument of precision, there were inaccuracy and confusion.

For about fifteen years the sphygmomanometer has been in common use and an enormous number of observations have been made. The profession has acquired experience with the instrument and has been able to draw some conclusions from that experience. From the nature of the condition, its insidious onset and symptomless course, observations on the blood pressure over a long period are desirable. It would be interesting to watch the course of the disease from its inception to its close. This is occasionally possible, but not often, as there is usually considerable hypertension before it is discovered. Once discovered, the question arises as to prognosis. With the dissemination of knowledge relative to high blood pressure among the laity, there has arisen a feeling that the person who has such a condition is speedily doomed and it is but natural that he should exhibit great curiosity as to the prognosis in his individual case. Scarcely a day goes by that the practitioner is not asked about the chances for life of some one whose blood pressure is above normal. With the idea that an analysis of an experience of twelve years might throw light on the question of prognosis and enable one to answer more intelligently questions in regard to it, this survey was undertaken.

Our present conception of hypertension is that it is, first, a manifestation of kidney disease; second, a manifestation of arteriosclerosis pure and simple without kidney involvement, or third, a manifestation of some disturbance or imbalance caused by the menopause. There may be a mixture of groups one and two and there may be other causes of hypertension but as all the patients except one in this series fell into the first three groups, discussion will be confined to them. In this series, any reading over 160 mm. systolic was considered pathological and when the readings varied from time to time an average was taken. Those patients were placed in the nephritic group who persistently showed albumin and casts and diminution of phthalein excretion. Those were placed in the arteriosclerotic or essential hypertension group who showed no albumin or faint traces or only occasional casts and no diminution in phthalein excretion.

Those were placed in the menopausal group who showed rise in blood pressure about the age of forty-five with no albumin or casts or diminution in phthalein excretion.

This series comprised 112 patients who were under observation for periods ranging from a few months to twelve years. In the series of 112 patients, fifty-one were of the nephritic group, and fifty-four were of the vascular group, while six were placed in the menopausal group. One was probably due to thyroid disturbance.

Of the 112 patients, thirty-eight or about one third are dead. Of those who died twenty-nine, or 76.3 per cent. were in the nephritic group and only nine or twenty-three per cent. were in the arteriosclerotic group. None of the menopausal patients have died. Of those living, twenty-two, or thirty per cent. are in the nephritic group; forty-five, or sixty per cent. are in the arteriosclerotic group; six, or eight per cent. are in the menopausal group.

In the nephritic group there are twenty-four men and twenty-seven women. Of the twenty-nine dead, seventeen were men and twelve were women; about seventy per cent. of the men and forty-four per cent. of the women. In the arteriosclerotic group there were fourteen men and forty women. Of this group nine are dead; three of whom were men and six were women, twenty-one per cent. and fifteen per cent. respectively. Fifty-seven per cent. of the nephritic group are dead, forty per cent. at the end of two years.

These figures show clearly that the greatest mortality is in the nephritic group and they also show that essential hypertension is much more common among women than men. This is probably due to a climacteric origin of hypertension in women.

In the nephritic group, those who died were under observation on an average of 2.3 years. Those who died in the vascular group were under observation on an average of 2.8 years. Those living in the nephritic group have been under observation on an average of three years. Those living in the vascular group have been under observation on an average of 3.7 years.

The cause of death, taken as a whole, was apoplexy in fifteen, or forty per cent.; heart disease in sixteen, or forty-two per cent.; uremia in three, or 7.9 per cent.; angina pectoris in two, or 4.25 per cent. and carcinoma in two, or 4.25 per cent. Several patients in this series had angina but did not die of it.

A consideration of the death rate in those showing a systolic blood pressure over 200 mm., gives twenty-four dead out of fifty-four, a percentage of forty-four. Those showing 200 and below were fifty-eight, with thirteen dead, a percentage of twenty-two. With approximately equal numbers in each group the mortality in those above 200 is double that below 200.

A consideration of the patients in the series showing a diastolic pressure over 100 mm. gives fifty-four with twenty-seven dead, a percentage of fifty. Those under 100 give fifty-eight with twelve dead, a percentage of twenty.

A consideration of the ages of the patients shows that the average age of the nephritic group was fifty-eight, the average age of the vascular group was sixty-six. Taking the ages by decades and grouping two patients below forty with the forty to fifty decade, we find in the first group twenty patients with eight deaths; the mortality being forty per cent. Between fifty and sixty there were twenty-five patients with nine deaths, a mortality of 34.6 per cent. Between sixty and seventy there were thirty-five patients with nine deaths, a mortality of 25.7 per cent. Between seventy and eighty there were twenty-one patients with eight deaths, a mortality of forty per cent. Over eighty there were five patients with three deaths, a mortality of sixty per cent. It would seem that these figures give a curve with two peaks, one occurring between forty and sixty, and the other occurring after seventy. This may be more apparent than real. Transient paralyses were found in twenty-four cases of the series, a percentage of 21.4. Fifteen or sixty-two per cent. are dead.

From a consideration of the facts set forth the following conclusions are reached:

1. The cause of hypertension in men is usually chronic renal disease. In women hypertension due to vascular disease is more frequent. This is probably due to a menopausal origin of the condition in women.

2. The prognosis is much more grave in hypertension due to renal disease than it is in that due to vascular disorder.

3. The cause of death is generally cardiac failure and apoplexy in about equal numbers.

4. Blood pressure of over 200 mm. is of grave significance, the mortality above 200 being double that below. A diastolic pressure of over 100 is an even more serious manifestation.

Carpenter and Quincy Streets.

Some Points in the Examination of the Heart for Life Insurance*

By FREDERICK W. PRICE, M. D., F. R. S., Edin.,
London,
Physician to the National Hospital for Diseases of the Heart; Senior Physician to the Royal Northern Hospital, London.

(*Concluded from page 618*)

An apical presystolic or diastolic thrill, indicative of mitral stenosis, must be carefully distinguished from mere vibration of the chest wall which may be occasioned by a forcibly acting heart when the ribs are rigid; in the latter case, by separating the fingers and placing them in the intercostal spaces the osseous vibrations are not felt.

Lastly, I would especially emphasize the great importance of percussing accurately the left border of deep cardiac impairment in cases in which the apex beat is faint or absent. For I have seen many cases in which enlargement of the heart, associated with myocardial degeneration, was not detected because of an omission in this respect. A combination of the existence of subjective symptoms during or after physical exertion, evidences of enlargement of the heart, and an absence of physical signs indicative of a valvular lesion, is of the utmost importance in the diagnosis of myocardial disease.

In pure mitral stenosis the first sound is altered in a characteristic manner; it becomes short, sharp, and clear, like a sudden snap. It may resemble the second sound so closely as to be mistaken for it, especially when the second sound is not well heard at the apex. In fusiform dilatation of the aorta beyond the ring, the second sound is sometimes not only accentuated but resembles the sound produced when a cork is drawn from an empty bottle. The second sound in the aortic area may be diminished and even practically absent in true aortic stenosis, the fusion of the cusps being such as not to allow such apposition as is necessary to cause an aortic second sound of the usual loudness. These auscultatory phenomena are of considerable diagnostic value.

INTERPRETATION AND SIGNIFICANCE OF MURMURS.

During recent years much has been written and a good deal of controversy has arisen regarding the significance of murmurs. I am not going to enter this field of controversy, but may I be allowed to remark that it seems to me that a good deal of misunderstanding has arisen because the same terms are employed in different senses by various writers. Thus, some use the term physiological, as applied to murmurs, as synonymous with the term functional employed by others. They are not synonymous, for, while functional murmurs may include what are called physiological by some writers, a murmur may be functional but not physiological, as, for example, relative incompetence of the mitral valve from dilatation of the left ventricle.

In the case of functional or inorganic murmurs, the valves themselves are healthy, in contrast with organic murmurs, in which the valves are involved. Functional murmurs are of frequent occurrence, and in every case in which a murmur over the precordium is audible, the question whether the murmur is functional or organic should be most carefully considered.

Functional murmurs include, among others, 1, bruits due to anemia; 2, those due to relative incompetence of one of the valves; 3, cardiopulmonary murmurs, and 4, murmurs which may be present when there is excitation of the cardiac action, as, for example, in Graves's disease.

Relative incompetence may be due to, 1, dilatation of the cavity of the ventricle; 2, enlargement of the orifice on account of relaxation of the surrounding

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*Read at a meeting of the Life Assurance Medical Officers' Association, London, January 4, 1921. The substance of this paper was published in a recent issue of the *Lancet*.

muscular structures; 3, enlargement of the ventricular cavity and dilatation of the orifice combined; and 4, owing to the shrinkage or stretching of the musculi papillares or chordæ tendineæ, as a result of disease. The condition is more common on the right than on the left side of the heart, and is almost unknown in aortic disease, being not nearly so frequent as in the case of the mitral valve. With regard to relative tricuspid incompetence, it should be remembered that the reflex of a certain amount of blood through the tricuspid orifice may occur under physiological conditions. In severe muscular exertion, for example, where the intracardiac pressure on the right side of the heart is excessive, a natural function of the tricuspid valve is to provide for a certain amount of regurgitation, and thus afford relief to the temporary embarrassment due to distention of the right ventricle.

Pathological relative incompetence is always consequent to some other condition. It may result from chronic Bright's disease or aortic disease, resulting in dilatation of the left ventricle and venous stasis in the lungs, mitral disease, and affections of the lungs which cause embarrassment in the pulmonary circulation, such as emphysema, cirrhosis, chronic fibroid tuberculosis, and chronic diseases of the bronchi. Among other causes are pulmonary stenosis or regurgitation, wasting states, toxic influences, such as alcoholism, lead, pneumonia, and diphtheria, acute febrile conditions, anemia, acute myocarditis, and myocardial degeneration. Relative incompetence is a somewhat common cause of mitral regurgitation. It may be due to simple overstrain of the heart, wasting states, toxic conditions, such as alcoholism, lead, pneumonia, and diphtheria, acute febrile affections, anemias, Graves's disease, acute myocarditis, fatty or fibroid degeneration of the myocardium, supernormal blood pressure, chronic Bright's disease, or aortic incompetence. Cardiopulmonary murmurs are murmurs produced outside the heart.

In investigating a murmur with regard to life insurance, the following points should be carefully noted: 1, The time of its occurrence; 2, the point of maximum intensity; 3, the direction of selective propagation—by which is meant that, instead of murmurs being audible equally well at all points of the chest wall from their points of maximum intensity, they are heard at a distance better in some directions than in others; and 4, its character. In every case the applicant should be examined in the standing posture and lying down, before and after gentle exercise, and during the various phases of respiration. May I point out that if a murmur is audible over more than one valvular area, it must not be inferred that more than one valve is necessarily affected. In order to be assured that this is the case, we must satisfy ourselves that there is either an increase in the intensity or an alteration in the character of the murmur, as the second area is approached; in other words, when more than one valve is affected, murmurs have separate points of maximum intensity.

Functional murmurs as a group present certain characteristics. They are almost invariably systolic in time, are often of short duration, and tend merely to accompany and not replace the cardiac sound. The point of maximum intensity is much more frequently in the pulmonary area, or rather below or external to it. While functional murmurs tend to be audible over the greater part, or even the whole of the precordium, their area of conduction outside the precordium is limited and their direction of selective propagation frequently does not coincide with that of organic murmurs. They are usually soft and blowing but are occasionally loud and rough in character. Their loudness not infrequently shows considerable variation from time to time. They are usually louder after exertion, and, indeed, may only be audible then. They vary with changes of posture, being usually louder when the individual lies down, and feebler or even absent in the sitting or standing posture.

Hemic murmurs are always systolic in time and are most frequently heard in the pulmonary area, next most commonly in the mitral area, the tricuspid area, and the aortic area—in the order named, the last named being comparatively rare. Cardiopulmonary murmurs are not absolutely synchronous with the beginning of systole or diastole and may precede or follow either; the point of maximum intensity does not coincide with any of the valvular areas, the murmurs being usually heard best over the margins of the lungs; and they vary with the phases of respiration.

If I were asked what significance I attached, from the point of view of life insurance, to the presence of a systolic murmur audible over the precordium, my reply would be that it entirely depends upon whether the murmur is organic or functional, and, if the latter, in which group the murmur should be placed. For example, cardiopulmonary murmurs may be totally disregarded as far as the heart itself is concerned.

SOME POINTS IN THE DIAGNOSIS OF THE VARIOUS FORMS OF CHRONIC VALVULAR DISEASE.

In conclusion, I should like to deal with some points regarding the diagnosis of the various forms of valvular disease. The fact is not sufficiently appreciated that it is not justifiable to make a diagnosis of aortic stenosis from the mere presence of a systolic murmur over the aortic area, additional evidence being required, as the murmur may be due to other causes. Among these causes are bruits due to anemia, murmurs associated with respiration, pulmonary stenosis, patent ductus arteriosus, pressure upon the aorta by a mediastinal tumor where no definite pulsation is present, mere roughening or stiffness of the aortic cusps or orifice, fusiform dilatation of the aorta just above the valve, what is called relative stenosis, and aneurysmal dilatation of the ascending aorta.

A diagnosis of aortic stenosis can readily be made when the following may be noted: The characteristic pulse, already described; displacement chiefly downwards and slightly outwards of the apex beat; a gradual, slow rise of the apex thrust—a slow heave, which is sustained; an aortic systolic thrill and murmur, with the direction of selective propagation upwards along the vessels of the neck, and a diminished or absent second sound. These features combined distinguish the condition from others that may give rise to a systolic bruit with its point of maximum intensity over the aortic area; when, however, only one or a few of these characteristic features are present, difficulty with regard to diagnosis may easily arise. Murmurs due to anemia and those associated with respiration have already been described.

One point alone is sufficient to distinguish aortic stenosis from pulmonary stenosis; in the latter, the murmur is never propagated into the arteries at the root of the neck. Further, the respective pulses differ materially in character, while in aortic stenosis there is evidence of hypertrophy of the left, and not of the right, ventricle, and the apex beat is characteristic. The physical signs of patent ductus arteriosus are a thrill and a murmur, having their point of maximum intensity in the second left intercostal space at least two inches from the middle line. The murmur is prolonged and occupies both systole and diastole; it commences shortly after the beginning of the first sound, and extends into a considerable part of the diastole; indeed, it may even persist almost throughout the whole cardiac cycle. It is not propagated to the vessels of the neck. This characteristic thrill and murmur may also be met with in arteriovenous aneurysm.

In the case of pressure upon the aorta by a mediastinal tumor where no definite pulsation is to be felt, the murmur is often audible over the vessels of the neck. An area of impairment may usually be detected, however, and there is rarely any alteration in the character of the second sound. When an aortic systolic bruit is due merely to roughness or stiffness of the aortic cusps or orifice, there is an absence of the characteristic pulse, of hypertrophy of the left ventricle in a young person who is free from kidney disease, and of the characteristic apex beat. In fusiform dilatation of the aorta just above the valve, the murmur is often heard over the vessels of the neck, but occasionally the area of impairment at the level of the second and third costal cartilages extends further out to the right than the normal limit, and the second sound is not only accentuated but is low pitched, ringing, and usually audible over a much wider area. As a rule, there is very little difficulty in diagnosing aortic stenosis from aneurysmal dilatation of the ascending aorta.

There is little or no difficulty in recognizing aortic incompetence in the great majority of cases. The characteristic radial pulse, the high pulse pressure, the greatly exaggerated pulsation of the arteries, the physical signs of hypertrophy of the left ventricle, the characteristic murmur, capillary pulsation, and, rarely, visible pulsation in the superficial veins, present a definite clinical picture with regard to the diagnosis of which there should be no mistake. It should be remembered, however, that the capillary pulse and pulsation of the superficial veins are occasionally also seen in other conditions. The murmurs of Duroziez is pathognomonic of the lesion. May I remind you that while typically the point of maximum intensity of an aortic diastolic bruit is over the inner end of the second right intercostal cartilage, it is frequently in the second left space, or immediately over the sternum, or, more rarely, at a lower level than this, approaching even the level of the apex beat, and in my experience more often nearer the left than the right border of the sternum. When the point of maximum intensity of the murmur is in the pulmonary area, the condition may be mistaken for pulmonary incompetence.

In this event, the points which should be remembered in considering the differential diagnosis are that pulmonary incompetence occurs more frequently in early life, that the pulse is not collapsing in character, that there is an absence of greatly exaggerated pulsation of the arteries and of capillary pulsation, that there is evidence of hypertrophy of the right, but not of the left ventricle, and that the accompanying murmur is very rarely propagated far down as the apex of the heart, and is never audible over the carotid artery. Dyspnea, cyanosis, and clubbing of the fingers are also more suggestive of pulmonary incompetence. It should be remembered, however, that both lesions may occur in the same individual, in which case there is usually a blending of the physical signs of both conditions. I have occasionally seen a diagnosis of mitral stenosis made in cases of aortic incompetence, when the point of maximum intensity of the diastolic bruit—especially when the bruit is only audible toward the latter part of the long pause—is as low as, or lower than half way down the sternum and on the left side of the middle line, and especially so when it is near the apex beat. The points of differential diagnosis are the following: In mitral stenosis the pulse is markedly different from that of aortic incompetence, and, further, there is an absence of greatly exaggerated pulsation of the arteries and of capillary pulsation, there is evidence of hypertrophy of the right but not of the left ventricle, the murmur is harsher in character, the first sound is short, sharp and clear, and the area of the thrill and murmur is usually very limited.

As far as my experience is concerned, more mistakes are made with regard to the diagnosis of mitral stenosis than any other valvular lesion. The lesion is often unrecognized, as the locality of the characteristic apical presystolic murmur is not infrequently limited, and the area may not be larger than one inch in diameter, while on the other hand a mere reduplication of the first sound is sometimes mistaken for mitral stenosis. The diagnosis is easy when the following conditions are present: The characteristic pulse; an apical presystolic purring or an apical diastolic thrill; evidence of hypertrophy of the right ventricle; an apical presystolic murmur or an apical diastolic murmur; a short, sharp, and clear first sound; and a reduplicated second sound. The thrill is almost pathognomonic. Some writers believe that a similar thrill may be present in aortic incompetence, and, therefore, that this affection should always be first excluded. The thrill must be distinguished from a mere vibration of the chest wall, which may be occasioned by a forcibly acting heart when the ribs are rigid, in the manner already described. The murmur is sometimes not detected, on account of the area over which it is audible being very limited; or in some cases there is from time to time a complete absence of thrill and murmur. In the latter case, we are justified in inferring that in all probability mitral stenosis is present from the character of the pulse and first sound, together with evidence of hypertrophy of the right ventricle and accentuation or reduplication of the second sound.

Some writers are of the opinion that a rumbling presystolic bruit is sometimes heard in the case of adherent pericardium in children. Even if this is so, the bruit is not rough and vibratory in character, neither does it terminate abruptly at the first sound, nor is the first sound modified in the way already described, and further, there are usually definite physical signs of adherent pericardium. As it is generally believed that a presystolic murmur at the apex is heard in certain cases of aortic incompetence, the question whether mitral stenosis is present in addition to aortic incompetence has occasionally to be considered. In this connection it may be noted that Flint's murmur has not the harsh and vibratory character which is commonly found in a presystolic bruit due to mitral stenosis, and if a thrill is present it is not purring in character. It should be borne in mind that both lesions may be present at the same time, and it is sometimes difficult, therefore, to say whether the murmur is that described by Flint or one due to the presence of mitral stenosis. In coming to a decision, the character of the murmur, the thrill, and the pulse—the characteristic collapsing pulse of aortic incompetence being modified if mitral stenosis is present as well—will be of assistance.

Mitral stenosis is sometimes unrecognized in cases in which there is associated incompetence; the presystolic murmur, instead of ending in the first sound, ends in a systolic murmur, and a diagnosis of a long systolic murmur is erroneously made. There is, however, a difference in character between the former and the latter parts of this continuous bruit, the earlier portion being rough and vibratory in character, and the latter blowing or musical. Further, we can observe the position in the cardiac cycle of the two parts of this continuous murmur by placing the fingers upon the apex beat or over the carotid artery.

When the second sound at the apex has disappeared, the presystolic murmur may be mistaken for a systolic murmur, and the modified first sound for the second sound. In this event, a differential diagnosis can be made from the difference in character of the two murmurs, from the fact that a presystolic murmur ends, while a systolic murmur begins with an accent, and by timing the murmur in the manner already indicated. When, in addition to the absence of the second sound at the apex, there is also no bruit present, mitral stenosis may not be recognized and a diagnosis of dilatation of the left ventricle made; in dilatation, however, a second sound is audible.

With regard to the diagnosis of mitral regurgitation, it is necessary to point out that a systolic bruit audible over the apex of the heart is not infrequently erroneously interpreted as indicative of organic disease of the mitral valve, when in reality the murmur is functional. In order to say that a mitral systolic murmur is indicative of organic mitral incompetence, we must satisfy ourselves that certain other physical signs are present. With this object in view, it is advisable to note, 1, the position and character of the apex beat; 2, the area and propagation of the murmur; and 3, the existence or absence of accentuation of the pulmonary second sound. In the case of a mitral systolic murmur due to organic valvular disease, owing to the presence of hypertrophy of the left ventricle, the apex beat is usually displaced downward as well as outward. When the degree of valvular disease is so slight that no definite downward displacement of the apex beat is present, its force is almost invariably increased, whereas in functional conditions it is likely to be less forcible than normal. If the murmur is propagated toward the angle of the scapula beyond the midaxillary line, we may be practically certain that it denotes the existence of organic disease. A definite accentuation of the pulmonary second sound, provided there is no condition of the lungs to account for it, is in favor of the view that we are dealing with organic disease. The diagnosis is further strengthened by evidence of the existence of mitral stenosis. The diagnosis of relative mitral incompetence due to chronic Bright's disease or to aortic disease from organic mitral incompetence is particularly difficult, since chronic nephritis and aortic disease in themselves give rise to hypertrophy of the left ventricle. In these cases the history of the case is of importance.

In addition to the points of differential diagnosis just enumerated, murmurs due to anemia and those associated with respiration have other distinguishing features. These have been referred to. Pulmonary stenosis is usually congenital and it is not my intention to deal with the diagnosis of congenital heart disease. All I would do is to point out that a diagnosis of pulmonary stenosis should not be made from the mere presence of a systolic murmur having its point of maximum intensity in the pulmonary area, as the murmur may be due to other causes.

The diagnosis of pulmonary incompetence is frequently a matter of considerable difficulty. The lesion with which it is most likely to be confounded is aortic incompetence, because the point of maximum intensity of the thrill and murmur of the latter is not infrequently to the left of the sternum. The differential diagnosis between these two conditions has been discussed under aortic incompetence.

In by no means an inconsiderable proportion of cases of tricuspid stenosis the lesion is entirely overlooked, no doubt on account of the absence of any murmur. It the opinion of Mackenzie, we may infer that tricuspid stenosis in all probability exists when pulsation of the liver is found to be auricular in type. The differential diagnosis of tricuspid and mitral stenosis is often a matter of great difficulty. The early appearance of marked cyanosis and of extensive dropsy are features in favor of the existence of the former lesion. When the point of maximum intensity of the murmur is strictly in the tricuspid area we can be fairly certain of the diagnosis. A diagnosis of tricuspid incompetence may undoubtedly be made when, after being emptied from below by means of the finger, the jugular vein rapidly fills from below, and when pulsation of the liver occurring synchronously with the apex beat, evidence of enlargement of the right side of the heart, a soft blowing systolic murmur having its point of maximum intensity in the tricuspid area, and diminution of the pulmonary second sound are present.

Miraculous Herbs

A Psychological Problem in Ethnology

By JONATHAN WRIGHT, M.D.,
Pleasantville, N. Y.

There is at present more of a tendency among ethnologists to take issue with Mr. Tylor than a few decades back, so far as the doctrine is concerned with which his name is especially associated. It can subtract nothing from the great guerdon of praise due him for having pointed out how similar are the workings of the mind of man in a similar environment to demur a little at some of his less important conclusions, but one of the things that will stand out in what I have to say here is the similarity of the phenomenon apparently associated in its most marked and typical manifestations with eras, or, in a broad way, with an era in the evolution of common belief among people, most of them thought of by us as oriental. The intense almost unreasoning belief in the efficacy of a certain drug or herb has become somewhat foreign to the modern mind, at least in the west, but we must at once admit that all gradations of this reverence are still seen on every side of us. The application of it is diffuse, though in general it is less universal, but it keeps alive innumerable nostra and fills the coffers of newspapers, scarcely less numerous, with funds derived from their advertising columns. Nay, this very primitive credulity is a great asset in the regular, I mean the legitimate and ethical practice of the art of medicine. All this is too familiar even to the layman to need anything more than an allusion. When, however, we meet with it as a manifestation of national even racial culture, when we observe practically all the individuals of a race at some more or less extended epoch believing unquestionably in the efficiency as a cure-all of some herb which modern science knows has little or no physiological action on the human system, we are at once face to face with a phenomenon which ought to be of as intense interest to psychology in its broad sense as it is to ethnology in a more specialized way.

These are the two leading topics of interest which are intimately associated with what I shall have to say, in a purely objective way, as to the ginseng, silphium, soma, haoma, and less at length as to other herbs now better known and of more powerful therapeutic action, as they are held in popular estimation. The universality of certain ethnological traits is a well worn subject and individual credulity is a familiar phenomenon to us all, but racial credulity when focussed on one subject, has been less often brought to the attention even of men of science. It is a legitimate part of the psychology which is being every day more and more studied in its application to small groups or to those of larger size and complexity. In the future it is bound to be much more developed, for it is not only of exceeding interest but it is manifestly of the greatest importance to know why men, in such large groups, think thus and so. For various reasons, chiefly because we ourselves are immersed in the modern crowd, it is more promising of practical results than is ordinarily postulated of the study of antiquity and antique man, to dwell a little on the foolish preoccupations of past ages rather than on those of our own day.

"Where the world wide doctrine of disease demons has held sway, men's minds have scarce had room for thought of drugs and regimen" (1). Now this is one of the minor points in Tylor's discourse to which even the parlor ethnologist may from the records of the observers far afield take exception. From these it is not superfluous for the purpose of this exposition to quote a small part of the evidence that the herb or other article nearly always has its part in the play between demon and disease, either as adjuvant or antidote to the demon's activities. This of course does not, as Ratzel remarks (2), absolutely exclude all reasonable study of phenomena. Even when he made a real discovery he had to surround it "with the hocus pocus of fetish rites and ceremonies" (3), The higher ranks of the profession always include one "who performs on a mat" (4). In the sanctuary of a Malay medicine hut the walls and roof hang with tufts of dry plants, but scattered over the floor lie bamboos covered with incised patterns of Malay magic (5). It is hardly correct then to say that the primitive medicine man has no room in his mind for drugs and regimen. He has them in mind but he uses them on a false therapeutic theory. The results, the phenomena are the same as in our culture, but he explains them differently. He selects his plant with reference to his conception of some demon who is preying on the insides of his patient, and when it is the castor oil plant he often rejoices in the evidence of a successful diagnosis. The bacteriologist is happy in the same confirmation of his theory.

I have often before insisted on the similarity in the facts or proof on which men rest their beliefs, but here I repeat it, to insist that whether the medicine man practises with a materia medica arranged on magical or bacteriological lines the drug or the herb is there for his use, and if it was once reverenced more than it is now or in China more than it is in New York, it is because the system on which its administration is based is worthy in the eyes of ancient or Chinese mankind of more reverence than other explanations vouchsafed at other points of time and space. Now this is a state of mind. It is just as much an objective phenomenon as the castor oil plant. I do not urge that bacteriologists have solved all the questions of etiology, but the culture out of which bacteriology sprang is here confronted by a psychological problem which demands from history and ethnology an explanation which is not forthcoming. Why did the bushman or the Chinaman think thus? Ignorance? We, in detached moments, acknowledge we are ignorant enough. We congratulate ourselves, when in another, a vaunting mood, that we have pulled ourselves bodily out of many of the devious mental channels, along which the primitive man paddled his canoe, but we still float on the broad bosom of the sea of uncritical credulity.

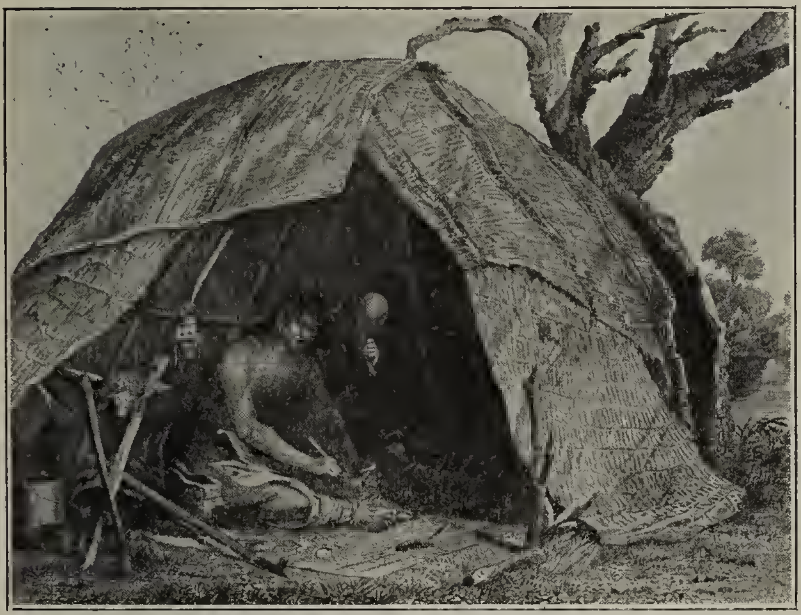

FIG. 1. (Schoolcraft.) Medicine man's hut.

This is a long introduction to the statement of a problem which is the chief object of this paper, but if it in any way helps toward an efficient solution, psychological as well as historical and ethnological, it may be pardoned. It would still be incomplete, however, if I have not made it apparent that I lay aside the phenomenon of the individual medicine man's state of mind, whether primitive or modern, whether Chinese or Yankee. I am referring to the state of mind of a race or an epoch or a jungle, not of an individual, however omniscient. With all the temerity of a dilettante, which is sometimes attractive from its mere freshness, I have ventured to modify a little the unguarded generalization of Tylor and perhaps it is equally superfluous to point out that the addiction of exceptional intensity manifested by remote cultures to some drug or plant, while apparently arising independently and based on the same folk psychology, is not always manifest to us in a study of primitive man and ancient culture in exactly the same terms. We know ginseng and silphium and peyotl and many others are actualities, but we are not sure that the *soma* of the Persians and the *haoma* of the Hindus were ever anything but a sort of mystical conception of their priesthood, possibly only a part of their ritual. If that is so, and it is only a suggestion, perhaps borrowed by me from another, it still does not alter the fact that there existed in a narrow circle of priestly craft a conception of a panacea, dimly traceable in the legend of Æsculapius and his daughters. Ginseng, silphium and other drugs innumerable have been panaceas more widely disseminated and not so exclusively confined to the family circle of the Asclepiadæ. Panaceia and Hygeia were the daughters of Æsculapius. They were doubtful figures in the old Greek myths and were much confused in practice. It was long before they stood for differentiated activities, but in later times they underwent a factitious differentiation. Since the decline of our faith in drugs we have almost again arrived at the viewpoint from which we shall be ready to declare that Hygeia, fully evolved, is as near Panaceia as any identical twin can be—that hygiene is in a fair way to become the true panacea. We must all die, but as Pat said, there is always a cure for every disease but the last one. We even hope by the intervention of Hygeia to arrest senility and delay death itself.

Though our interest lies entirely with the widest circles it cannot lose sight of the fact that racial credulity in its attitude toward therapy is to a large extent closely related to individual credulity, but crowd psychology in its manifestation of mental contagion becomes, or should be, vastly more impressive and furnish to the individual practitioner of medicine a weightier lesson than his individual experience. He knows how firmly fixed is the faith of his patients in the curative power of drugs or regimen possessing no therapeutic value except what the patient's credulity gives them. It is scarcely otherwise with primitive man. Many years ago Powell (6), taking the *Dispensatory* (U. S.) as a standard, thought about twenty-five per cent. of the whole number of herbs used by the Cherokees were properly employed, that is, used largely because of a definite physiological action according to that standard. In the forty years which have elapsed since the publication of that standard, accepted in Powell's day, one may suppose there has been a considerable shift of opinion as to the physiological and more as to the therapeutic value of the herbs involved, but it is not possible here to discuss that. It is quite evident that the vast majority of all herbs of antiquity, used in doctoring, are today valueless in the opinion of the practitioner. In that majority are to be included, with slight excuse for taking exception to the statement, the herbs with which I hope to illustrate what I have advanced—that there is a psychological problem involved for the ethnologist as well as for the practitioner of modern medicine.

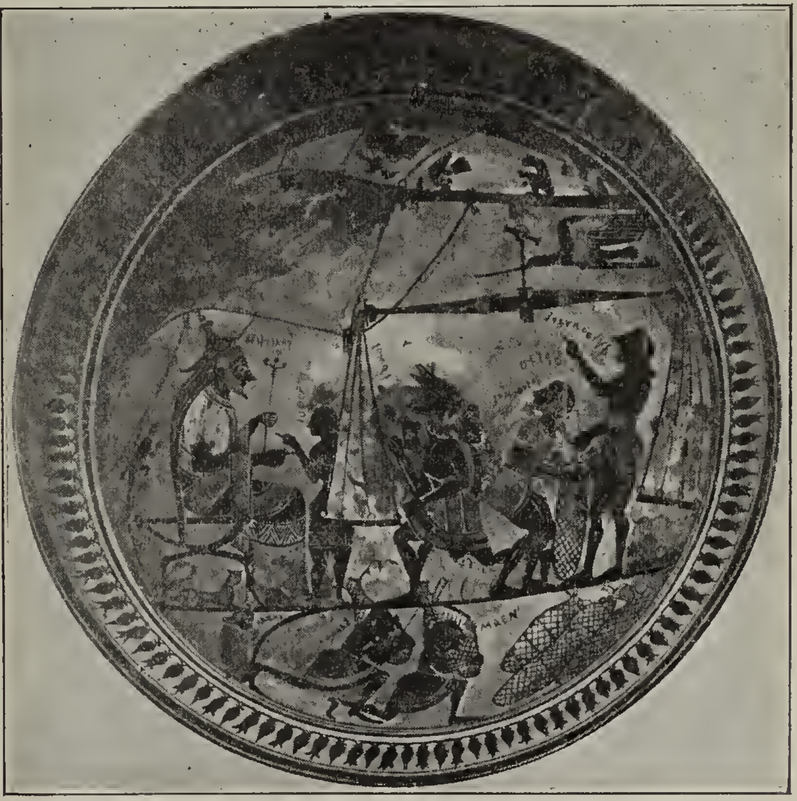

FIG. 2. (Babelon). Archelaus and the silphium.

Having thus disposed of definitions and explanations and circumnavigated as well as I can the shoals of exceptions and objections to the claim that the problem is one at all apart in any of its manifestations from others concerned with the psychology of man, I trust I can at least be brief in summarizing the outstanding objective factors in the problem as they are to be found in history and the less specialized paths of ethnology, and I shall here attempt no contribution to the solution of the question as to the foundations of the beliefs of men.

In the Persian *Zend Avesta* (7), it is true, the highest order of healer was he who performed his functions by means of holy words and we may place him along side of the primitive doctor, "who performs on a mat," but here again closely allied to these incantations, this hocus pocus the missionary calls it, were the herbs. From the plants which spring up by thousands around the body of the primordial bull Gaokerena, fifty kinds growing from the body itself, Ahura Mazda brought forth the healing ones. The only thing here definitely advised was the *haoma.* Though the haoma plant, at least etymologically, is the same as the Hindu *soma,* and is one of the many links which connect the two cultures as essentially those of one race in remote antiquity, it has never been identified. On earth it perhaps eventually lost much of its reality through being transferred in the liturgy to heaven, but it bespeaks the existence once on earth of some plant especially calling for reverence because of the supposed virtue it contained in the estimation of a race, a race which was a conquering one and founded one of the oldest and mightiest of civilizations, whether Aryan or not or what the exact route of their migration. In the *Zend Avesta* we read:

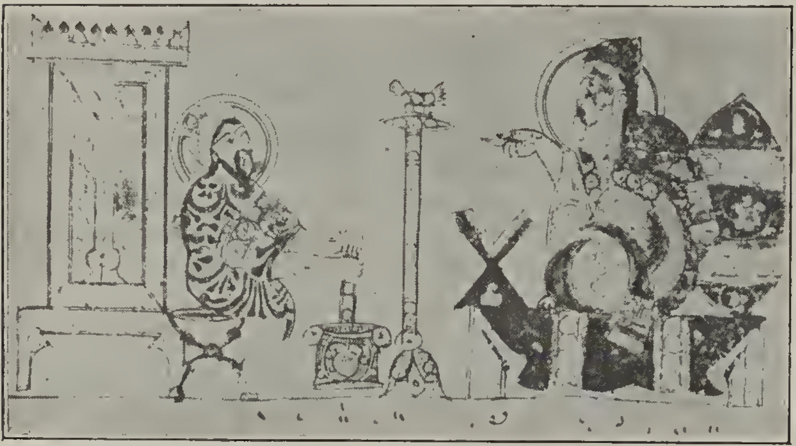

FIG. 3. From an early medieval manuscript of Dioscorides, with Arabian descriptions.

> "There are two Haomas: one is the yellow or Golden Haoma, which is the earthly Haoma and which, when prepared for the sacrifice, is the king of healing plants; the other is the white Haoma or Gaokarena which grows up in the middle of the sea, Voura-kasha, surrounded by the ten thousand healing plants. It is by the drinking of Gaokarena that men, on the day of the resurrection will become immortal." (LXIX)

In the Hindu epic, in the *Rig Veda* (8), the reference to the *soma* plant is no less impressive and it appears in many of the hymns,

> "I took some *soma* when the sun rose up, O Mitra Varuna. That is the sick man's medicine." (Book VIII, Hymn LXI).
>
> 6. "He who hath store of herbs at hand, like kings amid a crowd of men—
> Physician is that sage's name, fiend, slayer, chaser of disease,
> 7. Herbs rich in *soma,* rich in steeds, in nourishment, in strengthening power,
> All these have I provided here, that this man may be whole again."
>
> 21. "All plants that hear this speech, and those that have departed far away
> Come all assembled and confer your healing power upon this herb.
> 22. With soma as their sovereign lord the plants hold colloquy and say:
> 23. Most excellent of all art thou, O plant; thy vassals are the trees." (Book X, Hymn XCVII).

Here the critics (9) are a little more positive in conjecturing that the soma is some kind of a milk weed whose fermented juice causes intoxication. If we are to identify it as hashish, on the strength of the reference in Herodotus (10) to the Scythians and the island dwellers of the Araxes, we would rank this reverence of Persian and Hindu with what we know from Safford (11) of the peyotl of our southwest which he thinks the Aztecs also had. This would be a class whose psychological relationship places it in one with opium and alcohol.

If we have to depend on deification for evidence of the profound belief a whole people once had in the soma or the haoma, we are driven more forcibly to the same conclusion as to the silphium plant for the people dwelling in the basin of the Mediterranean in the time and prior to the time of Hippocrates, but from quite a different kind of evidence, chiefly that of price. Soon after the Hippocratic era its vogue began to lessen despite the fact it became much more rare, though it was a precious article even in the time of Cæsar. We miss it in Homer and Hesiod, though in the former we get mention of the wonderful moly which was administered by Circe in the Odyssey (12). We first meet the silphium in Herodotus, who says he lived four hundred years after Homer. It was found, he says (13), on the Mediterranean coast of Africa in Cyrene, roughly corresponding in its extension to the coast from Tunis to Tripoli, a territory of wonderful fertility for Africa, from the island of Platea to the mouth of the Syrtis. He says, "weasels are produced in the silphium, very like those at Tartessus," and Aristotle (14) remarks: "In the plant silphium is found a small serpent." What these passages mean I cannot imagine, but evidently something with affinity to African magic. I will not stop to specify the references to its physiological properties as Hippocrates believed in them. In the index to Littré's edition (15) they are readily found. It was a moderate stomachic and intestinal irritant, ranking apparently below the hellebore and the euphoribæ as a purge and possessing some carminitive properties, but its

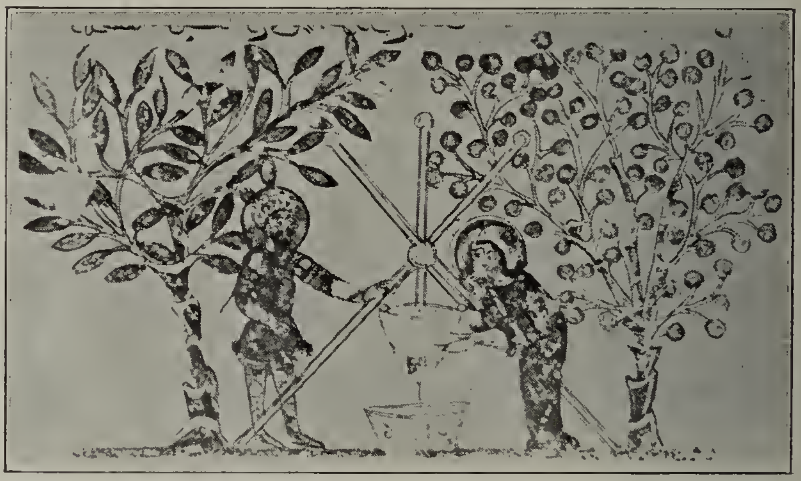

FIG. 4. From an early medieval manuscript of Dioscorides, with Arabian descriptions.

use, even in *Hippocrates,* places it among the panaceas, external as well as internal. Stalk, leaf, root, juice, all possessed more or less of the virtues so highly prized that in Aristophanes's plays (16) we find it used as a synonym for wealth.

It was the source of the wealth of the Battidæ, rulers of Cyrene. Sophocles in a tiny fragment (603, Pearson) evidently is referring to their territory when he speaks of a "meadow of silphium." He who had the most of silphium stalks in his strong box was indeed a rich man. Not as a medicament only, but as a condiment, it is spoken of both by Hippocrates and by Aristophanes. In the latter it is to be "grated over the meat, the dead bodies of the birds, with the cheese." Pliny (17), though he relates its virtues and magnifies the therapeutic value of it, said it had disappeared in his day from the African coast and was found only as an inferior variety in Syria and in a few other places. It could not be made to grow in Attica, but if the infatuation for it had not declined we may be sure that it would never have ceased to grow, carefully protected by the shepherds and the masters alike in Africa instead of being grazed down, as Pliny says, by the animals of the landlords of the sheep walks. A hundred years later, in Galen's time it had sunk to the average level of medicinal herbs of commerce, but when Cæsar plundered the treasury of Rome, besides the gold and silver, he found 1,500 pounds in weight of silphium. In the later Greco-Roman medical writers, it is mentioned indeed by Paulus Aegineta (18) and in his translation Adams makes a lengthy commentary on it referring to the chapter devoted to it by Dioscorides in the first and second century A. D., possibly after Pliny, but Cassius Felix (19) in the fourth or fifth, scarcely alludes to it. Under the Arabians it had its renaissance, but a comparatively feeble one. Although Theophrastus (20), the successor of Aristotle, described it with considerable care and much ingenuity, modern critics have, on the whole, failed to identify it. Ridgeway is said to have suggested it might be the lotus plant, certainly a very remarkable guess. Littré translated it asafetida in his earlier volumes but later abandoned that designation, possibly because de Candolle was quite sure it must be a species of Thapsia. No one has suggested any herb known to the modern pharmacopœia, which has ever been mentioned as likely to have been the silphium, worth the price paid for it in Athens in the time of Aristophanes. The only rival to it which has persisted in its reputation to modern times is the ginseng.

While it is sometimes said that the ginseng root, owing to its form, has a reputation among the Chinese as an aphrodisiac, that is properly only one of the magic properties ascribed to it. The materia medica of the west recognizes no therapeutic value of consequence in it, but there are many still alive who remember how once every hillside, in certain sections of the south and western parts of the United States, was searched for it. It was brought by woods-possibly after Pliny, but Cassius Felix (19) in the made large fortunes in exporting it across the Pacific, fifty years ago. How much of this traffic still exists I do not know, but in my boyhood it furnished a livelihood to many a trapper and hunter more sure by far than his skins, though what the magnitude of it was in figures I have never seen. On this side of the globe hundreds, doubtless thousands of men, sought an inert root for the treatment of millions of fellow beings in China ten thousand miles away. These facts are familiar practically to all of us. In order to present the Chinese evidence I make use of a foreign author, a traveler in China and Thibet, a Catholic missionary and a keen observer, well known two generations ago. I use a much later translation of Huc's *Travels in Tertary, Thibet and China* (21).

"Jin-seng is perhaps the most considerable article of Mantchourian commerce. Throughout China there is no chemist's shop unprovided with more or less of it. The root of jin-seng is straight, spindle-shaped, and very knotty; seldom so large as one's little finger, and in length from two to three inches. When it has undergone its fitting preparation, its color is a transparent white, with sometimes a slight red or yellow tinge. Its appearance, then, is that of a branch of stalactite. The Chinese report marvels of the jin-seng, and no doubt it is, for Chinese organization, a tonic of very great effect for old and weak persons; but its nature is too heating, the Chinese physicians admit, for the European temperament, already, in their opinion, too hot. The price is enormous, and doubtless its dearness contributes, with a people like the Chinese, to raise its celebrity so high. The rich and the mandarins probably use it only because it is above the reach of the other people and out of pure ostentation. The jin-seng, grown in Corea, is of very inferior quality to that of Mantchouria." The zeal with which it is still sought there may be gathered from the account of Colonel Younghusband (22): "At night we would put up in a sable hunter's hut. These are met with every twelve or fifteen miles, and each is the head-quarters of a party of hunters who trap sables and also seek the gin-seng root—the root of a plant upon which the Chinese set great store for medicinal purposes. But the gin-seng plant seekers would wander through the forest day after day and all day long, and if they found one plant in the season they would be content. This plant would be worth perhaps £15, for the Chinese believe the genuine wild plant to have the most wonderful properties."

I think most readers will agree, if they have followed my citations thus far, that we have here a problem that justifies the title of this paper. It is not only a problem for the psychologist and the ethnologist but a certain amount of instruction may be gathered from its study by the modern therapeutist.

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Editorial Articles

THE DRUG PROBLEM

The drug problem is serious in all parts of the world and perhaps especially grave in this country. The habit has been always more or less prevalent here because there is a mixed population, including a considerable number from Asia in whom drug taking is as common as smoking in America and, to some extent, because California is sufficiently near to Asia to make it comparatively easy for habit forming drugs to be smuggled in. However, there appears to be no doubt that since the war the drug traffic for illegitimate purposes has increased immensely in all civilized countries and that it has become a menace to the health and efficiency of the population of all countries.

It seems that America is now awake to the magnitude of the evil and that drastic steps will be taken to suppress the traffic in dangerous drugs. As a matter of fact, the government has been aware of the gravity of the situation in this respect for some time and have caused to be passed extremely stringent laws to prevent the illicit sales of habit forming drugs. Moreover, these laws have been well administered but in spite of this, drug taking has been found to be greatly on the increase. So much was this the case, that in 1918 a special committee was appointed by the Federal Government to investigate the question, the report of which was published in June, 1919.

It is noteworthy that this investigation took place before prohibition came into force and therefore attention may be drawn to the fact that drug addiction was esteemed a matter for national concern some time before prohibition became law. The point is worthy of careful notice because it is contended by some that the great increase in the drug habit is due mainly to prohibition.. This law may have aggravated the habit, although there is little to prove that this is so, but it was a standing evil before. Indeed it has been proved that the use of alcohol and drug taking have flourished simultaneously.

The report is very illuminating on the subject. It shows that of all the civilized countries, of course, excluding all the countries of the Far East, the United States was the largest opium consuming country for which statistics are available. According to this report the per capita consumption of opium was as follows: Italy, one grain; Germany, two grains; Portugal, two and a half grains; France, three grains; Holland, three and a half grains; United States, thirty-six grains; Great Britain was not included in this list but if common report may be relied on, it now takes a prominent place among the European countries as an illicit consumer of dangerous drugs.

Another reason for the drug habit which has been sedulously fostered and propagated by those who presumably wish to cover its true causes, is that most of those who were confirmed drug takers became addicts owing to the careless administration of narcotics by physicians. This charge has been completely refuted and the good name of the medical profession restored as far as this calumny is concerned. It was found that the great majority of the victims were initiated when young, were mentally unstable, and fell into vicious hands; in fact, were exploited for the sake of profit. It was also found that, as a rule, treatment was futile, the vast proportion relapsing soon after they were discharged as cured. The trade is too profitable to allow its victims to reform if possible. Laws, even if stringently enforced, appear to be absolutely useless to prevent or to restrain to any appreciable degree the drug traffic, and the only means for effecting this purpose is to restrict the output. The manufacture and sale of habit forming drugs are profitable and therefore difficult to prevent, and yet the only certain mode of killing the illicit use of dangerous drugs is to restrict the output to the requirements of the medical and dental professions.

A RETROSPECT OF RECENT MEDICAL SCIENCE

It is a truism to say that medical science has progressed, as the proofs of this advance are before our eyes. However, there are some people who need to have their memories quickened in this direction, so that it is in the order of things to draw attention to certain conspicuous features which especially demonstrate this advance.

In the first place, the most remarkable public health event in civilized countries of the past twenty years or so has been the drop in the infant mortality rate. In America and in Great Britain during that period the fall has been progressively rapid, and, moreover, bids fair to continue. The result is mainly owing to maternity and child welfare work, which, by the way, has taken firm hold in all parts of this country.

Another striking piece of evidence of the manner in which medical science has advanced is the fact that people are living longer than formerly, and, as a rule, are a great deal more active in their old age than was formerly the case. This addition to the span of life may be rightly set down to the credit of medical science. With regard to longevity a somewhat curious but suggestive point has been brought out in some statistics of the Metropolitan Life Insurance Company published in the early part of this year, to the effect that overweight is a distinct disadvantage among insured lives, that is, overweight after the age of thirty-five or thereabouts, when it begins to be dangerous even in relatively small amounts. On the other hand underweight, at any rate after the age of forty, is a favorable omen for long life. Those who weigh between ten and twenty per cent. below the average show the best conditions for longevity.

While this may seem like a digression from the matter in hand, it may be borne in mind that medical science is concerned in keeping within healthy limits body weight, and more so than ever before in the history of medicine now that the value of diet is beginning to be understood at its true worth and the functions of the endocrine glands and the vitamines are commencing to be correctly estimated. Of course, in the advance of medical science, the discoveries with relation to the endocrine glands are by no means the least important and suggest amazing possibilities in the way of treatment, some of which even now appear to be on the high road to fulfillment.

As for the triumphs which medical science have won over epidemic diseases, that is an old story which he who runs may read.

With regard to cancer, in this country, at least, there seem to be signs that some progress is being made in treatment and prevention. Probably, these are the fruits of the educational campaign, that people come for advice and treatment in the early stages of the disease when measures calculated to cure the disease can only be effective.

A certain amount of progress has been made in the treatment of tuberculosis, but it must never be forgotten that pulmonary tuberculosis is essentially a house disease and it is in the improvement of domestic hygiene and of environment generally that its successful treatment and prevention may be looked for. Public sanitation has done and is doing great things in the interests of health and it is now time that attention was particularly paid to housing and domestic hygiene. Not only are inadequate and unhygienic houses and city environment the root causes of tuberculosis and its development but of several other preventable diseases.

Apart from tuberculosis, cancer and influenza, there is altogether too much of what may be termed general sickness and a considerable part of this general sickness, among children in particular, is due to unhealthy home conditions which should be remedied at once, no matter how great the cost.

With respect to parasitic diseases medical research has done and is doing valuable work. Fortunately in this country medical research is not starved. The rich men of America have the vision and imagination to realize that any money expended in the furtherance of health will be returned one hundredfold. The presence of disease is a menace to the community. Those who are not in good health cannot work zestfully and energetically and are discontented and a large discontented element in the population is dangerous to the body politic. However, it is well known that it is to the advantage of all that the members of a nation should be healthy, and it follows that it is equally obvious that money expended for the attainment of this object is money well spent. No money could be better spent than for medical research.

THE ACUTE CARDIOHEPATIC SYNDROME IN CHILDHOOD

The acute cardiohepatic syndrome in children presents a variable onset and evolution. It may be sudden in development or, on the contrary, the onset may be slow. The former condition represents the acute, the latter the chronic type of the cardiohepatic syndrome.

The acute type of this syndrome arises in a large number of very different circumstances. All morbid processes which engender hypertension in the pulmonary artery system may provoke it. The infectious diseases likewise produce it, either by determining material lesions of the cardiac fibre or by simple junctional perturbations. These arise quite frequently in diphtheria, scarlatina and typhoid fever.

A detailed examination of the patient frequently reveals an increase of the cardiohepatic dullness. On the other hand there is tachycardia, the number of pulsations being in direct relation to the temperature. The tachycardia of course indicates a lowered blood pressure; the cardiac sounds are weak and distant, but quite distinct from the dull murmurs of endocarditis.

There exists an entire series of functional symptoms—more especially hepatic—difficult to identify in the morbid complexus. The syndrome may remain latent, while in other instances it may be the source of serious accidents, even of sudden rapid death. In reality, certain symptoms such as tachycardia, lowered blood pressure, weak pulse and dullness of the cardiac sounds may reveal glandular insufficiency, particularly hypoepinephria, but in these cases the heart remains normal in size. This distinction is not merely of dogmatic interest; it has very different therapeutical consequences because in cardiac insufficiency cardiac stimuli are indicated, while in glandular insufficiency opotheraphy is required.

The acute cardiohepatic syndrome is often encountered in acute articular rheumatism, usually associated with endocarditis and pericarditis. The intensity of the syndrome indicates the gravity of the cardiac involvement. The syndrome arises in the nephritides, especially those of scarlatina.

There is first of all a sudden marked increase in the blood pressure which is temporary, and this is followed by a drop in the pressure, after which the cardiohepatic phase begins.

The acute cardiohepatic syndrome of the nephritides is met with in adults as well as children, but with notable differences resulting from the quality of the tissues. In children the cardiac fibre is young, possessing all the proprieties of elasticity, toxicity and contractibility, and although these are momentarily lost, they rapidly return. Cardiac asthma, acute pulmonary edema, angina pectoris, and signs of left ventricular insufficiency met with in adults are absent in children, because in them the right ventricle readily becomes dilated. Sudden arterial hypertension causes paroxysms of eclamptic uremia in children just as it does in pregnancy. But in the circumstances under consideration, it is not an intoxication uremia, because the symptomatic phenomena are the result of arterial hypertension only; and if the heart and liver dilate the convulsive seizures do not occur, and if they have appeared, they cease as soon as the hypertension retrogresses and the cardiohepatic phenomena develop.

Hence it is clear that the cardiohepatic syndrome of the acute nephritides has a fair prognosis if appropriate treatment is resorted to in time. It is only exceptionally, and when the nephritis is prolonged, that the reaction on the heart and liver is likewise prolonged.

EDUCATION REGARDING CANCER

It seems to be generally admitted that cancer is on the increase in most civilized countries. Mr. Frederick Hoffman goes so far as to say that the mortality from this cause in this country is now approximately one hundred thousand a year, or equivalent to a rate of one hundred to the one hundred thousand of population. He also proceeds to say that the disease is increasing from year to year in practically every State, and in practically every community for which the records are available and trustworthy.

It is hoped that Mr. Hoffman is too pessimistic as regards the future, although there is no doubt that his object in making known the prevalence and increase of malignant disease in civilized countries, as it seems to be preeminently a disease of civilization, is most praiseworthy, namely, to draw public attention to the state of affairs and to frighten people, if necessary, into employing curative or preventive measures. It is further a matter of common knowledge that the only effective method known as yet for treating cancer is to deal with it in the early stages, the earlier the better.

Professor W. W. Keen, of Philadelphia, quoted by Professor A. Primrose, of Toronto, in an article contributed by him to the *Canadian Medical Association Journal,* March, 1923, has said, "If every woman who found a lump in her breast would consult a surgeon at once, that is to say, within forty-eight hours if possible, but in any case within a week, I am sure that eighty-five out of every hundred would be cured and stay cured." While other surgeons do not agree with Professor Keen in these conclusions, it is the opinion of one of the most distinguished surgeons of the world. In any event, it is a matter of universal agreement among members of the medical profession, that the treatment of cancer in the earliest stage possible gives the best hope of a successful or even of a satisfactory issue. In order to bring this about the educational campaign in this country was inaugurated and has been extended to embrace Canada and Great Britain. According to Canadian reports a good deal of enthusiasm has been aroused by the campaign just begun and it promises to be successful in that country. It is stated that as a result no doubt of this public education cancer cases are brought for treatment at an earlier stage than formerly and presumably the treatment, too, is more successful. The campaign in Great Britain will probably not make headway so rapidly as in this country and in Canada. The profession there is more conservative by far than on this side of the Atlantic and already several objections have been urged against the prosecution of a widespread public campaign.

It is not that in Great Britain the profession does not wish the public to be educated with respect to the early symptoms of cancer, but rather that by some at least the wisdom of certain of the methods adopted to carry out this education is doubted. However, there seems to be a general agreement that the propaganda in this country has had a good educative effect. As Dr. Billings has pointed out, with the cooperation of an enlightened, that is, of an educated public, the death rate from tuberculosis has been lowered, while typhoid fever, typhus fever and many other deadly epidemics have been almost eradicated under civilized peace conditions by the application of known and tried reliable means of prevention. It certainly is true that until the public becomes interested in the prevention of a disease little can be done, and therefore if it is hoped to prevent or even check the prevalence of cancer the public must be educated as to the methods of accomplishing this in order to be interested. And this education must come from the medical profession with the powerful aid of the lay press.

In concluding these remarks on educating the public regarding the early symptoms of cancer it may not be amiss to point out that there are general practitioners who are not skilled in the early diagnosis of malignant disease, who, in fact, but rarely meet with a case. Thus a certain proportion of the medical profession itself requires more practice in the diagnosis of cancer in its various forms and in its earliest stages, but, of course, this has been all provided for. Education regarding cancer widely disseminated should be a long step forward in the prevention of the disease.

MENTAL HYGIENE IN NEW YORK STATE

The Year's Work in Mental Hygiene is the title under which the New York State Charities Aid Association publishes in pamphlet form its annual report to the State Hospital Commission and that of its Mental Hygiene Committee. This pamphlet has recently been distributed to those interested.

The Mental Hygiene Committee has four main lines of work. It informs the public through lectures, exhibits, literature and published articles about the nature, extent, causes, treatment, and means of preventing mental diseases and defects. It promotes remedial legislation, and brings to the attention of the public and the proper officials the essential facts about the prevalence of mental disorders, and the financial and other needs of the State institutions for the care of the mentally diseased and defective. It promotes the establishment and effective operation of free clinics for mental disorders and defects, especially in connection with State institutions. Finally, it acts as a bureau of information about the examination and treatment of the mentally sick and deficient, and about institutions for mental disorders.

Among activities carried on throughout the year covered by the report were the holding of public meetings with addresses; the visiting and inspection of State hospitals for the insane and State schools for the feebleminded, with reports on the same to the proper authorities; the study of measures before the Legislature dealing with care and treatment, and the taking of appropriate action; bringing the needs of the State institutions to the appropriating authorities; cooperating in a health survey of Erie County conducted under the auspices of the National Child Health Council; maintaining a social service department which assisted 502 individuals toward better mental health and social adjustment; and furnishing to the Cornell Clinic until April 15th a psychiatric social service through which three hundred patients received advice, treatment and aftercare when necessary.

New legislation relating to mental diseases during the year created a centralized State Department of Purchase, and a cooperating Bureau of Standards; an amendment to the civil practice act provides a measure that has been long desired by State hospitals and other institutions, namely, that all writs of habeas corpus directed to the authorities of a State institution must be made returnable in the country in which the person is detained or before the nearest authorized official; a permanent commission on pensions, to inquire into the subjects of retirement, pension allowance, and annuities for State and municipal officers and employees, was created.

In November, 1921, a psychiatric clinic was opened under the auspices of the committee at the East Harlem Health Centre of the American Red Cross.

The report of the State Charities Aid Association to the State Hospitals Commission announces a special reappropriation of nearly $3,000,000 for the construction of a new civil State hospital at Creedmoor; and, in addition, the annual appropriation bill has allowed $1,989,500 for new construction and improvements at the thirteen State hospitals. From previous appropriations, 1,500 new beds will probably be made available before the end of the year. An overcrowding table shows an increase of almost two per cent. in overcrowding as compared with the previous year. This table shows the population, exclusive of paroles, of the State hospitals to be 37,713, their rated capacity, 30,484, which means an overcrowding of 7,299, or 23.7 per cent. Manhattan State Hospital on Ward's Island is tabulated with a population of 6,506, rated capacity, 5,047, overcrowding 1,459, or a percentage of 28.9. This statement is of exceptional interest as bearing on the tragic loss of life resulting from the recent fire there.

The association reports improvement of personnel in the hospitals, and of medical service. A great asset to the latter has been the purchase of x ray apparatus for several of the hospitals. Perhaps the most significant development of the year was the grant by the Legislature of a special appropriation of $13,700 for occupational therapy in the hospitals. An important new mental clinic was opened during the year at Troy by the Hudson River State Hospital. This makes a total of forty State hospital clinics now in operation.

The report closes with an urgent plea for larger appropriations to relieve the serious overcrowding, the greatest since the first year of the war. "The patients are now herded together with no chance for privacy or a feeling of space and freedom. . . . Beds everywhere, greedily absorbing every bit of available space—long uninterrupted rows of them in close formation; beds packed in so tightly in some instances that not even a finger's breadth separate them, so that the patient has to get in and out over the footboard; two beds as a regular thing in rooms designed for only one patient; many beds jammed into corridors; others so much encroaching upon day rooms that the patients have no suitable place in which to pass the long waking hours."

Another crying need for State care of the mentally sick is a system of State Psychopathic Hospitals. These should be established, not in New York City alone, but in every important population centre in the State., A beginning should be made at once in New York City .

POPULATION PROBLEMS IN NEW YORK

The 1920 Census Committee of New York City has recently issued a book entitled *Statistical Sources for Demographic Studies of New York,* which reveals some interesting figures and facts as to population.

New York City is now larger than the whole nation was in 1800. The increase of southeastern Europeans from 1910 to 1920 was nearly three fourths of a million, the total number of these citizens now exceeding the whole English stock of the country's first census. New York contains a tenth of the nation's stock of northwestern Europeans. During the increase of its southeastern white stock, there was a decrease of a quarter of a million of its northwestern European stock. Southeastern European born natives have increased from 47,595 in 1880, to 1,329,811 in 1920; northwestern Europeans have decreased from 630,885 to 599,140. It holds over a fifth of all the Italian, Hellenic, Slavic and Yiddish population of the nation. The Russian element, which is ninety per cent. Jewish, is more than a million in number, and its increase from 1910 to 1920 was greater than the increase of native whites of native parentage. This signifies that, in every one hundred persons of the whole population of the United States, one is of Russian birth or parentage and living in New York. Nearly one third of the city's population is of Italian and Russian parentage combined. More than a third of the foreign born living in the areas of high population density are of Russian derivation, and more than one fifth, Italian. The Italian element, also, showed an increase larger than the native parentage element.

Two thirds of this large and varied population is housed on less than ten per cent. of the area of greater New York. The rim of the city has grown two hundred per cent. in ten years; the hub, eight per cent.; and the suburbs even more. The districts in New York which have a population density of more than 219 persons per acre, the average density of London's most congested sections, still have 1,895,457 people; London had in 1911 less than 180,000 in districts where the population density is over 219 to the acre.

The death rate is lowest in the densest district of Manhattan, for reasons not yet fully known, one of them being the low susceptibility of the Jewish people to tuberculosis. In the old sections of the city, especially along the water front where the houses are old, and the races dwelling there susceptible to tuberculosis, the death rate is highest.

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News Items.

Seventeenth French Congress of Medicine.—The Seventeenth French Congress of Medicine will meet at Bordeaux from September 27 to 29, 1923. The congress has already published the program for the scientific session.

American Urological Officers.—At the annual meeting of the American Urological Society held on May 21st to 23d at Rochester, Minn., the following officers for 1923-24 were elected: President, Dr. James A. Gardner, of Buffalo; vice-president, Dr. Herman L. Kreschmer, of Chicago; treasurer, Dr. James B. Cross, of Buffalo, and secretary, Dr. Homer G. Hamer, of Indianapolis.

American Otological Society Election.—The officers for the ensuing year of the American Otological Society are as follows: President, Dr. John B. Rae, New York; vice-president, Dr. D. Harold Walker, Boston, Mass.; secretary-treasurer, Dr. Thomas J. Harris, New York. The members of the council are: Dr. H. S. Birkett, Montreal, Canada; Dr. George Shambaugh, Chicago, Ill.; Dr. L. W. Dean, Iowa City, Ia.; Dr. J. G. Wilson, Chicago, Ill.

Laryngological, Rhinological, and Otological Society Officers.—The American Laryngological, Rhinological, and Otological Society has elected the following officers: President, Dr. Hanau W. Loeb, St. Louis, Mo.; vice-presidents, Dr. F. N. Sperry, New Haven, Conn.; Dr. T. E. Oertel, Augusta, Ga.; Dr. Ray Connor, Detroit, Mich.; Dr. T. E. Carmody, Denver, Colo.; Dr. E. R. Lewis, Los Angeles, Cal.; treasurer, Dr. E. W. Day, Pittsburgh, Pa.; secretary, Dr. W. H. Haskin, New York, and editor, Dr. G. L. Richards, Fall River, Mass. The board of directors voted to hold the next annual meeting in St. Louis, Mo., early in May, 1924.

Société Médicale de Geneva.—The centennial of this society was celebrated on May 12th. At the same time the pediatrists and radiologists of Switzerland held their national meetings in Geneva and joined in the celebration.

American Academy of Ophthalmology and Otolaryngology.—This organization will hold its twenty-eighth annual meeting in Washington, D. C., on October 16th to 18th. The guest of honor will be Sir William Lister, of London.

Society Election.—The Chicago Society of Internal Medicine at its eighth annual meeting elected the following officers for the ensuing year: President, Dr. Robert H. Babcock; vice-president, Dr. Solomon Strouse, and secretary-treasurer, Dr. Newell C. Gilbert.

New York Homeopathic Medical College Dinner.—The Alumni Association of the New York Homeopathic Medical College and Flower Hospital gave its annual dinner at the Hotel Pennsylvania, June 7th. About 175 members, including eighteen newly graduated interns, were present as well as many distinguished members of the medical profession. Senator Royal S. Copeland addressed the guests.

American Medical Association Annual Session.—Great preparations are being made for the next annual session of the American Medical Association which is to be held in San Francisco from June 25th to 29th. All the large hotels in San Francisco are reserving rooms for members of the association. Reservations on the "M. D. Special" of the Northern Pacific Railway are rapidly being made. Dr. A. W. Ide, of St. Paul, is arranging the tour and information relative to the plans can be obtained from him. His address is 914 Northern Pacific Building.

American Laryngological Association Officers.—The American Laryngological Association has elected the following officers for the ensuing year: President, Dr. J. Payson Clark, Boston, Mass.; first vice-president, Dr. Hubert Arrowsmith, Brooklyn, N. Y.; second vice-president, Dr. J. B. Greene, Asheville, N. C.; secretary, Dr. George M. Coates, Philadelphia, Pa.; treasurer, Dr. George Fetterolf, Philadelphia, Pa., and librarian, Dr. Joseph H. Bryan, Washington, D. C. The members of the council are: Dr. Norval H. Pierce, Chicago, Ill.; Dr. Harris P. Mosher, Boston, Mass.; Dr. Harmon Smith, New York, and Dr. Emil Mayer, New York.

American Gynecological Society Elects Officers.—At the annual meeting of the American Gynecological Society held at Hot Springs, Va., May 21st, 22nd, and 23rd, the following new officers were elected for the ensuing year: President, Dr. Barton Cooke Hirst, Philadelphia, Pa.; first vice-president, Dr. John Osborn Polak, Brooklyn, N. Y.; second vice-president, Dr. Herbert M. Little, Montreal, Canada; secretary, Dr. Arthur H. Curtis, Chicago, Ill.; treasurer, Dr. Charles C. Norris, Philadelphia, Pa. Other members of the council are: Dr. Robert L. Dickinson, New York; Dr. Walter W. Chipman, Montreal, Canada; Dr. George Gray Ward, New York; Dr. John A. Sampson, Albany, N. Y.; Dr. W. C. Danforth, Evanston, Ill., and Dr. Floyd E. Keene, Philadelphia, Pa.

Dr. W. J. Mayo Honored.—Dr. William J. Mayo, of Rochester, Minn., received the honorary degree of Doctor of Laws on June 11th from McGill University.

Health Statements to Be Discontinued.—The Office of the National Health Council at Washington, D. C., announces that the biweekly statements on national health legislation will be discontinued until Congress meets again.

Harvard University Appointments.—John H. Mueller, Ph. D., associate professor at Columbia University, has been appointed assistant professor of bacteriology at the Harvard University Medical School. Dr. Hilding Berglund has been appointed assistant professor of medicine.

Music Called Good Medicine.—A sixty day test with phonograph was completed in the wards of the New York Nursery and Child's Hospital. The test demonstrated that the waltz is good medicine and soothing. Well chosen music will now form part of the treatment of patients in that institution.

Cornell Medical Degrees.—Sixty-four students were graduated this year from the Cornell Medical College at the annual commencement exercises held in the college hall, First Avenue and Twenty-first Street. Dr. Livingston Farrand, president of Cornell University, made the address and awarded diplomas.

Jefferson Medical College Commencement.—The ninety-eighth annual commencement of Jefferson Medical College was held on June 1st. One hundred and forty-seven men received degrees; twenty-three members of the class received commissions as first lieutenants in the Medical Officers' Reserve Corps of the army.

Dedicate Jewish Hospital.—The Jewish Memorial Hospital at Dyckman Street and River Road was formally dedicated to the memory of soldiers, sailors, and marines who made the supreme sacrifice in the late war. Letters from President Harding, Vice-President Coolidge, Governor Smith, Theodore Roosevelt, Jr., General Pershing, and Herbert Hoover were read.

Health in New York State.—Dr. Edward S. Godfred, Jr., director of the Division of Communicable Diseases of the State Department of Health, has submitted to Commissioner Biggs a report showing the prevalence of the more important communicable diseases for the month of March and for the first three months of 1923, as compared with the same period for 1922 and with the average figures for the corresponding period during the last five years. Measles, scarlet fever and whooping cough are running high this year, while typhoid fever and diphtheria are materially lower. The scarlet fever this year seems to be of an especially mild type, only thirty deaths having been reported for the first two months out of 2,700 cases during the same period. In 1922, with almost precisely the same number of cases, there were fifty-four deaths. On the other hand, the fatality rates for typhoid fever and diphtheria have been higher; that for typhoid amounting to twenty per cent. of the reported cases and a little less than ten per cent. for diphtheria.

LONDON LETTER

(*From our own correspondent.*)

London, *April 6, 1923.*

PSYCHOLOGY IN INDUSTRY.

The annual meeting of the British National Institute of Industrial Psychology was held in the rooms of the Royal Society, London, a short time ago. The Earl of Balfour, in moving a resolution expressing the need for the application of the sciences of physiology and psychology to the improvement of occupational conditions, said it was one of his oldest beliefs that in Great Britain, in spite of the immense services rendered by British men of science to the great scientific work in which all the world should cooperate, they had as a nation underrated the great value of the work which science could do for society. The primary work of the institute was to make the labors of the wage earner easier, smoother, requiring less painful effort, leaving the pleasures of work, for there were pleasures of work, but as far as possible eliminating those other elements which too often intruded and made work a torture rather than a pleasure. Those were matters in which the psychology of industry must inevitably play a leading part, and it was extraordinary how much scientific method could do to eliminate effort which one would naturally think was intimately known to every employer and every worker who had to deal with industrial problems. They had only to glance through the reports of the institute to realize how much intelligent investigation and experiment could do to elicit the true laws that ought to govern physical effort in this or that particular industry. Science in their case had not fallen into the mistake of generalizations.

One of the directions in which intelligent effort was being pushed by the institute was to make such experimental investigations as would demonstrate what particular class of work should be most congenial and most successfully pursued by this or that candidate for employment. It did not treat all mankind as cast in the same mould, but it realized that there were individual differences between individual workers. It was of fundamental importance that scientific investigations should be made into the capabilities of the workers in the great industrial edifice in whose safety and ornamentation all were equally interested. Their labors touched the lives of all workers in the country, and they only touched those lives to improve and make them happier.

DANGEROUS DRUGS.

The Home Secretary has given notice recently that he has made new regulations under the Dangerous Drugs Act, 1920, amending the regulations already in force. These amending regulations come into effect forthwith. The chief alteration made is that doctors, dentists or veterinary surgeons, when giving prescriptions for dangerous drugs, are no longer required to sign the prescription with their full name. Instead it is provided that the prescriber shall sign with his usual signature, and, on the other hand, that a druggist shall only dispense a prescription for the drugs either if he is acquainted with the prescriber's signature and has no reason to doubt the genuineness of the prescription, or if he has taken reasonably adequate steps to satisfy himself that the prescription is genuine.

A REGULATION TO BE REVOKED.

It is announced that the Home Secretary proposes to make a regulation revoking that clause in the Dangerous Drugs Regulations which provides that a prescription for dangerous drugs may not be given for the use of the prescriber himself. In other words, a medical man will be able to order himself opium and cocaine as formerly. When the Home Secretary gave notice on October 7th of the regulation now to be revoked it was stated that the regulation which had the concurrence of the General Medical Council was made because several cases had recently been brought to his notice in which medical men who were victims of the drug habit procured considerable quantities of cocaine and morphine by giving prescriptions. It would not, it was added, affect a doctor's existing powers of procuring the drugs for use in the practice of his profession. In the House of Commons on February 28th, Sir Sydney Russell-Wells protested against the regulation, and urged the Government to withdraw it.

THE USE OF NONLETHAL GASES IN WARFARE.

There has just been issued from the press the volume of the medical history of the war dealing with gas warfare, in which it is stated that as the war went on nonlethal gas was widely used and it is hoped that in the next war the object will be to overcome or disable the enemy by these means rather than to kill him. It is interesting to note in the book that a destructive gas had not been discovered long before an antidote was found by chemistry so that, despite the statements often made with regard to the terrible effects to be expected from the gas warfare of the future, it seems that most of these alarmist statements may be discounted also.

HEALTH OF ROYAL AIR FORCE FOR 1921.

The health of the force in 1921 was better than in the previous year. India, however, showed a higher rate of sickness than in any locality in which the Force was stationed. There were more accidents in 1921 than in 1920, there having been 114 cases of injury and death in the former as compared with the latter year. Eighty cases occurred in Great Britain and thirty-four abroad. There were thirty-one deaths. Officers are medically examined once in each year. It was found at these examinations that 2,576 officers had flown 96,000 hours during the year. On the Eastern stations sand fly fever was the cause of a great deal of trouble. It is stated that as a result of researches carried out by R. A. F. bacteriologists at Malta a spirochete has been found similar to that isolated in hemorrhagic jaundice. A careful study was also made of glare and its effects on the eyes of pilots and it was discovered that ordinary tinted glasses are useless to prevent glare but special Crooke's glass U. B. and U. D. types were found satisfactory.

On April 2d last Inspector-General W. H. Lloyd, M. D., R. N., the oldest officer of his rank in the navy and the senior naval honorary surgeon to the King, died in London. William Harris Lloyd was born in Waterford, Ireland, in 1836, became a surgeon in the navy in 1856, and was on the active list for forty years. In August, 1862, when serving on the flagship Nile, in North America, he took charge of a number of yellow fever cases from the Rinaldo, and in the same month it happened that a death vacancy occurred in the sloop Peterel. In accordance with the custom of the service at that time, this vacancy was filled by a promotion on the station, and Dr. Lloyd became a staff surgeon. In May, 1866, he was appointed to the Jason in North American waters. His merits had now attracted attention and although he rose to the highest rank in his branch of the navy he never again served in a ship for ordinary medical duties. He served as secretary to the section of military surgeons at the International Congress of London in 1881, and represented the Admiralty in the same congress held in Washington in 1887. He retired from active service in September, 1896. In 1894 he was appointed an honorary surgeon to Queen Victoria, and from 1901 to 1910 respectively he was also an honorary surgeon to King Edward and King George.

VIENNA LETTER

(*From our own correspondent*)

VIENNA, *March* 30, 1923.

(*Concluded from page 705*)

The Medical Faculty has of late formed a peculiar habit, that of nagging at and belittling any progress in matters medical, *if made outside Vienna.* A few instances may be cited. In the course of a discussion on the therapy of ulcer of the stomach and duodenum, which went on for six weeks at the weekly meetings of the Vienna Medical Association, I was asked by Professor Eiselsberg to take part in the discussion. When I mentioned the real progress made in the United States by Sippy's treatment, nobody knew or had even heard the name of Sippy. One of the professors of stomach diseases, an internist, asked me if I meant "Mississippi," and thereupon pronounced the treatment as a mere modification of the well known old Leube treatment. He evidently never grasped the idea of thorough alkanization. And the eminent surgeon Eiselsberg thought they would certainly achieve success similar to that obtained by Sippy, if they only had enough milk in Vienna—but unfortunately they had none.

Here is another instance. The Surgical Clinic in Manchester reports a case in which respiration stopped during a cerebral operation, while the heart continued to beat for five hours, by means of artificial respiration. The doctors over here immediately recalled a similar incident that happened on one occasion when Billroth, assisted by Professors Salzer and Eiselsberg, operated on a young girl for struma. By continuing artificial respiration for six hours, the girl's life was saved. The case observed in England is therefore not the only one known, and perhaps "more patience in continuing the artificial respiration might have saved the patient's life."

There are about three thousand five hundred physicians in Vienna, scarcely one hundred of whom —I make this statement after having interviewed at least one hundred of them!—are in possession of a blood pressure instrument! Imagine such a state of affairs in the city in which lived Professor Basch, the originator of scientific blood pressure work. I have many times heard Professor Wenckebach lecture to his pupils, and in the postgraduate classes, on the absolute necessity of having a blood pressure apparatus. But it costs a fortune—twenty-five dollars! Compare with this our general practitioners, who carry in one pocket the stethoscope, in the other the Tycos. The physicians over here are ultraconservative, or rather so poor that they will not and cannot spend any money on new diagnostic or therapeutic instruments.

Most of the Viennese medical periodicals have had to reduce the size of their issues quite considerably, because of the high cost of paper and printing. In consequence of this reduced reading space there is very little opportunity for the few remaining scientific workers to have their articles published. The library of the medical association cannot even think of subscribing to the number of foreign medical periodicals it used to possess in prewar times; this accounts for the very inadequate information obtained by the physicians over here with regard to the medical and surgical progress of the Western nations, and also for their general lethargy and loss of idealism. Although this state of affairs has now lasted for years, the physicians and professors in Vienna consider it to be merely a temporary phase. It may be so—but I think it my duty to inform my colleagues in the United States of these conditions before they decide to spend their money on a rather nonremunerative trip to Vienna. Personally I do not believe that the medical Mecca of Vienna will ever celebrate its resurrection. It will share the fate of old Alexandria, Athens and Rome.

The constant effort to belittle the other fellow has become very obnoxious to me, as well as to many other Americans who relate numerous similar incidents from the various clinics. While I realize that the little fellow always tries to aggrandize his smallness by detracting from the merits of the big fellow, I consider this trait to be characteristic of the medical fraternity of Vienna precisely as it is characteristic of all the socalled intellectuals of Vienna; they always speak of their high culture, which nobody can take from them, of their greatest music centre, their great theatres, etc. They do not realize that their stage art has become the glorification of licentiousness, the chief problem dwelt upon being the sexual one; for fully eighty per cent. of their new plays are devoted to the Messalinan cult. The stage is, to a large extent, devoted to what we should term, in the United States, "indecency." I might mention dozens of plays—new pieces—which I have witnessed at the best play houses. There is the *Reigen,* written by the best connoisseur of Viennese life—Arthur Schnitzler; in it a woman, changing her sweethearts seven times, disappears behind a curtain for the purpose of cohabitation. Then there is the *Flamme,* by Hans Müller, a renowned author, which reveals the naked truth about the fast woman, the interior of a brothel and its workings on the open stage! The *Woman of Forty,* by Sil-Vara, is again a sexual problem. Or the new play *Es,* by the physician Schoenherr, in which only two persons, man and woman (physician and wife) debate on the stage, through the whole play, on the right of the tuberculous man to create children. He performs an abortion on his wife, and we even witness her awakening out of the anesthetic on the open stage!

It seems, in fact, well nigh impossible to go to a theatre without seeing sexual problems ventilated. In its drive against existing evils, the revolution also appears to have torn down the fences of decency and good manners. It is evidently the inherent duty of a revolutionary author—if he has any selfrespect at all—to express his thoughts indecently.

Under the false flag of socalled art, an absolutely naked woman—of rare beauty—performed dancing feats every night at what were formerly respectable playhouses, and many other instances might be quoted. A very influential part of the public criticizes this downfall of art mercilessly. They point out the fact that though many of these plays are called by harmless sounding names, even a cavalry sergeant might learn to blush on witnessing them. They demand stricter censorship. Literary or theatrical "booze," they argue, should no more be served to the public than alcoholic beverages are allowed to be served to juveniles—and so forth.

It took fully a month's agitation in the newspapers of Vienna before the chief of police had the naked woman dancer chased out of the city. Think of a "centre of culture" deliberating for more than a month before taking action against such a public nuisance! One theatre (Kammerspiele) gives nightly performances of the French trash work, *Le Jardin de Supplice* (the *Garden of Torture*), by Octave Mirabeau. In this play a woman artist (of some reputation!), Mrs. Konstantin by name, is seen lying on the floor of the open stage in libidinous convulsions, brought on by the horrible cries of a half naked man who is suffering agonies through having a red hot knife stuck into his spine! Not being able to produce a sufficient supply of theatrical rubbish of its own, Vienna has had to import French filth from Paris for the Viennese connoisseurs.

And yet I believe that a reform movement has set in of late in this general decadence. Two years ago about eighty per cent. of all the plays performed on the Viennese stage were devoted to sexual problems, while the percentage today does not attain fifty per cent. And why? Because the Social Democrats, when they came into political power two years ago, demanded the creation of the socalled *Kunststelle*, or art office. The latter buys outright fifty performances a year from the Burg Theatre, and twenty performances from the Grand Opera, both of which rank highest among the theatres and are subsidized by the government.

The art office pays to the theatre, two weeks in advance, twenty-five per cent. of the price the full house would average, the remainder being paid by the State. The same art office has made similar arrangements with other private theatres, but has to pay a higher price to them. In order to be able to meet this, it receives certain subsidies from the municipality out of the moneys the latter collects as luxury tax. This tax, amounting to sixty per cent. of the gate receipts taken at public entertainments, balls, dancing halls, barrooms, etc., enables the municipality to contribute a good deal to the money needed by the art office. Seats are distributed, by the art office, among the members of the five different political organizations and two private organizations, these comprising the employees of State and county and the members of most of the intellectual organizations (physicians, lawyers, university graduates, students and others). It is evident that these new poor, who constitute the standard bearers of the old civilization and culture, are thus enabled to obtain cheap seats at the theatres and to compel the managers to offer them good plays. One evening I chanced to drop into a theatre performance given for the benefit of the *Kunststelle*, and experienced a revelation. There were no low neck gowns, no shining solitaires in the boxes, but only humbly dressed, serious looking men and women, listening to a first class play at the expense of the profiteers, the standard bearers of depraved taste.

The art office also gets up philharmonic concerts and educational lectures for the benefit of the organizations it represents. It collaborates with the Ministry for Public Education, and it is certainly an institution well worthy of imitation in other countries.

The musical performances at the large music halls (Musikvereinssaal, Concerthaus, Staatsoper) seem to be the only culture left. It appeals to me, because I knew Vienna before it had acquired the earmarks of Sodom and Gomorrha, to be able to read such notices as one I recently saw. A Mozart, Schubert and Strauss evening to be given for the benefit of the "Help the Children" drive at the large Musikvereinssaal, etc.

Apart from this step in the right direction there is no romance left, no poetry—just outright, naked sensuality. And the Viennese places of popular amusement—the *kinos* (movies) are on a level with those we used to see in the United States ten years ago. Their funny shows are usually smutty stories, and it is a real treat to see some imported American humor or fun on the screen, not permeated by filthy thoughts. Their American bars, where society dances the shimmy and bathes in wine are, thank God, a thing of the past in America.

The picture of Europe, with its moral destitution, its noisy materialistic attitude, and its gaudy neglect of everything spiritual, poetical or romantic, needs no detailed description. Men imbued with better sensibilities and idealistic ambitions can hardly suppress their disgust and horror. The people of refinement explain this deterioration of good taste, on the stage, by the fact that the new rich, with their low grade of culture, constitute the bulk of theatregoers—and the theatres must cater to the taste of their patrons.

It would be unjust not to mention that there are a few public spirited men in this unutterably miserable city who call loudly for reform—a lonely call in the desert! A high government official, Kestranek by name, comes to the following conclusions after reviewing the Report of the American Committee for the Stoppage of Industrial Waste (*Neue Freie Presse,* January 5, 1923):

"On seeing the efforts of the said committee to utilize all possibilities for an increased output of work, the question suggests itself, What would that committee have said if it had investigated the conditions existing in *our* country? Over in the United States, in that great, rich country, every unnecessary movement of the hands, every second of time is scrupulously saved, whereas here, in this miserable, beggarly state, material as well as time and human strength is wasted. What would such a committee have reported if it had, for instance, studied our railroads and found loafing employees everywhere—numerous strong men, whose whole day's work consisted in punching tickets for an hour or two and wasting the rest of the day in playing cards? Or if it had found a vast number of strong men busying themselves exclusively with swinging little red flags to keep the public from crossing the rails, as if that same public, when out on the highways, needed guardians to save them from being run over by street cars or dashing autos?"

Kestranek closes his remarks by changing the words spoken by Goethe one hundred years ago, "America, you *are better off* than our old Continent!" into "America, you *are* better than our old Continent!"

The Medical Faculty of Vienna also realizes the need for revival. It tries with all its remaining might to regain its former lead in the world. They have established postgraduate courses of two weeks' duration at intervals of three months, to be attended by general practitioners. There are six to eight speakers each day, and every one of these speakers gives a synopsis of the subject chosen. To the man who follows medical literature sufficiently closely, it is a good recapitulation of things already known; but still I do not find much practical value in these theoretical dissertations, which any physician may read in his library without going to the trouble of making a special trip to Vienna. On listening to most of the men, I was often discouraged about the incompleteness of the lecture. I recall having once listened to a professor of surgery for two hours on the topic of treatment of wounds. At the end of the lecture I asked the professor if he had ever heard of Dakin's solution. "Oh, yes," he replied, rather embarrassed, "I really forgot to mention it!"

I have previously made the remark that the professors have become mercenary. You have all heard of mirion, the great iodine preparation; Professor Fröhlich, the pharmacologist, gave a lecture before the representative Viennese Medical Society on its merits. Professor Finger dwelt upon its excellent effects in syphilis, lupus erythematodes, etc. Many of those high merits have since been proved to be nonexistent, but some of the professors have invested the larger part of their savings in the manufacture of mirion. Under such circumstances we must not expect unbiassed opinions—especially not from Finger, who fought the introduction of salvarsan with all the means at his disposal years ago (a Jew, Ehrlich by name, was its originator, as we know) but has been using it at his clinic ever since. And Finger's assistant, Professor Kyrle, is now fighting Steinach's interstitial gland experiments with similar means.

Among some of the things which I find worthy of imitation is the recent institution of medical seminaries—weekly gatherings of general practitioners, at which two recognized authorities answer questions that are put to them beforehand either in writing or by telephone. Every evening is devoted to one specialty, and the speaker must be prepared to answer every question in an up to date fashion. The educational value for the general practitioner is far greater than that derived from postgraduate courses, if he attended them, because the latter take in far too limited a field of medicine and then dwell too broadly on those limited fields. The originator of this Seminary of the College of Viennese Physicians, Professor Biehl, is seconded by its secretary, Dr. Flesch, in making every effort to render these gatherings a success. And judging by the large number of physicians attending them, they certainly are a success. Until now, evenings have been devoted to questions pertaining to internal medicine, surgery, gynecology, pediatrics, dermatology, urology, physical therapy, neurology, tuberculosis, x ray treatment, psychotherapy, orthopedics, ear, nose and throat diseases, etc.

This same idea is carried out in *Ars Medici*, a medical paper of international circulation; it contains a section on questions, put by general practitioners, and answers given by recognized authorities on the subject. It was for this reason that I have promoted the English edition of *Ars Medici* for our American confrères.

For more than two years I attended the weekly meetings of the Viennese Aerztegesellschaft (Medical Society of Vienna) closely and conscientiously. Once I went to Prague, and attended the weekly medical meeting of the German Society. The scientific standard held by Prague is, in my opinion, higher by far than that in Vienna. The Viennese Medical Faculty—to judge by the fifty per cent. of the students coming from the Balkan States and Eastern Europe—may be all right and good enough as a medical centre for those less civilized nations, but it surely can no longer aspire to be the medical mecca of the Western nations.

I have no doubt that all this may seem somewhat scathing, and that I shall find a great many objectors. I have stated the truth as I saw it, and have nothing to fear, nothing to gain by what I have said. I realize that a good number of the physicians who come over here from the United States do so merely for the purpose of getting a diploma from the Vienna University, in the belief that it will draw a certain crowd to their home offices. I know, from my close association with the American Medical Association of Vienna, that many of these diploma chasers have spent but a few weeks in the respective clinics, but diplomas were given to them provided they paid the fee—a thing which was not possible in prewar times, until at least six months' clinical courses had been attended. But poverty has compelled the university to be lenient.

Most of the American doctors who have been in Vienna will, in their hearts, admit that my remarks are correct. They will not dare to make the statement loudly, however, because they would lose, by so doing, something for which they have paid dearly—the nimbus of having been in Vienna. Most doctors scold and cuss a great deal, while over here, but they keep silent as to the inferiority of things medical in Vienna, as soon as they reach home soil. Any physician who really wants to learn something does not need the Vienna finish; there are plenty of excellent postgraduate schools in America. I shall never forget the wonderful impressions I took with me from clinics like those of the Mayos, Crile, Bloodgood, Finney and dozens more!

The fact that physical decadence causes mental decadence has been brought home to me quite intensely here in Vienna.

Book Reviews

FUNCTIONAL ALBUMINURIA AND NEPHRITIS

Die funktionelle Albuminurie und Nephritis im Kindersalter. Von Professor Dr. Ludwig Jehle. Wien, Leipzig und München: Rikola Verlag, 1923. Pp. 68.

The pathologicoanatomical and clinical questions associated with albuminuria are manifold and difficult to determine definitely because of the different terms and classifications used and the divergence between the clinical appearance and the pathological anatomy of the disease. The extrarenal factors (vasomotor, neuropathic and mechanical) also tend to complicate matters. In addition, there is also a peculiar predisposition and an abnormal body constitution, which influence the clinical appearance of renal disorders. The condition may be malignant, may show an indeterminable etiology, and cause difficulty in making the diagnosis and in instituting the proper treatment in infancy. The treatment cannot be determined by any one symptom, but should be directed against the entire symptom complex. The symptoms of a local renal injury should be differentiated from those caused by extrarenal factors or by the affection of the entire organism. The character of the renal injury is determined by uranalysis and the renal functional tests, whereas the other organic injuries require a thorough clinical examination.

The diseases of the urinary organs are divided into orthostatic—lordotic albuminuria, functional nephritis and renal diseases. A special chapter deals with acute nephritis (glomerulonephritis), chronic nephritis, the nephroses, the therapy of renal diseases. syphilis of the kidney, hypernephroma, paroxysmal hemoglobinuria, and tuberculosis of the kidney. Cystitis and bacteriuria are considered as well.

LOCAL ANESTHESIA

Practical Local Anesthesia and Its Surgical Technic. By Robert Emmett Farr, F.A.C.S., Minneapolis, Minn. Illustrated with 219 Engravings and Sixteen Plates. Philadelphia and New York: Lea & Febiger, 1923. Pp. xviii, 529.

This very latest book presents the author's personal observations and the experience of twenty years in local anesthesia. The technic of the various methods of securing local and regional anesthesia (except spinal anesthesia) and their advantages are described in great detail. The illustrations and actual photographs are very numerous and a number of case reports are cited. The first part of the book deals with certain problems in connection with anesthesia, including the equipment and surgical technic. Great stress is naturally laid upon the anatomy of the sensory nervous system. Regional anesthesia and the different operations that may be carried out with it are described in full. The necessity of teamwork on the part of the assistants and the importance of considering the psychic factor of the patient receive special consideration. The proper technic in the induction of local anesthesia requires perfection in the anatomical, surgical and psychic elements to achieve success. Additional accessories in the form of improved instruments, technic and necessary aids are also mentioned. These are distinct advances in the art of local anesthesia, that have come to stay, inasmuch as they have proved their worth. Every conceivable angle of local anesthesia, both from the surgeon's and patient's standpoints, are taken up. No one who professes to be an up to date surgeon can afford to be without this valuable and epoch making volume. It contains much that can be found nowhere else.

HEMATOLOGY

Hematology in General Practice. By A. Knyvett Gordon, M.B., B.C., B.A., Cantab. New York: William Wood & Co., 1923.

This little book is primarily intended as a guide to the general practitioner. It is by no means an elementary textbook of hematology. Its chief emphasis is on a "rough examination of a stained blood film." The author states that the accurate counting of the total number of red or white cells is usually unnecessary. The book contains a number of generalizations that are unfortunate and a number of case histories that are unconvincing. The theoretical basis for the vaccine treatment that he recommends is unsound. Thus, because a patient showed a very slight leucocytosis, cocci were sought for in the stool and eventually found, a vaccine was prepared and the patient was cured in three months. On page 38 the author describes a case of anemia with a count of 7,000,000 red blood cells and a hemoglobin of eighty per cent.

The book is of little value and to an uncritical reader will do more harm than good.

DUFF HOUSE

Duff House Papers. Edited by Edmund I. Spriggs, M.D., F.R.C.P. Volume One. Illustrated by 190 Figures, Six Charts and One Colored Plate. Oxford Medical Publications. London: Henry Frowde and Hodder & Stoughton, 1923. Pp. x, 387.

This report contains many articles by various authors and includes some of the work done since the opening of Duff House in 1913, which is now collected and published in book form. These articles appeared in *The Quarterly Journal of Medicine,* the *Lancet,* the *British Medical Journal,* the *Proceedings of the Royal Society of Medicine,* and the *British Journal of Surgery.* The article Food and How to Save It was published by the Ministry of Food. The new material includes a manual for diabetic patients and is intended for the information of the diabetic who is thus enabled to cooperate with the physician in the treatment. It teaches the patient how to examine the urine and how to select and prepare his diet. It is very practical in scope. There are also chapters on diabetic cooking and special gardening, written by specialists. About half of the book is devoted to a detailed account of the x ray technic employed at Duff House for examination of the alimentary canal. The röntgenograms are very numerous, clear and illuminating and may well serve as a röntgenological atlas of the alimentary canal. This book should prove most interesting to the gastroenterologist, metabolist and röntgenologist. Like most of the Oxford medical publications, this report is a beautiful example of the bookmaker's art.

DEAR BRUTUS

The Plays of J. M. Barrie. Dear Brutus, A Comedy in Three Acts. New York: Charles Scribner's Sons, 1922. Pp. 140.

Old familiar friends appear in a garb fresh and dainty yet sober in this edition of Barrie's works. Yet these friends are none too familiar, for many of them have passed over our stage and gone until thus revived for closer and more lasting companionship. *Dear Brutus* has all of Barrie's charming grace whereby he comes close to that intermingling of comedy and tragedy which makes up human life. The play presents Lob, a little being immeasurably old and yet ever young, from the core of life itself. This wight has read the secrets in the lives of the friends gathered about him. Wistful yet fearful he sends them into the wood of dreams where they may read the secrets themselves that those "who have the grit in them" may shape their lives anew. Barrie's skilful use of the dream mechanism is but a part of the subtle intuitive psychology with which the entire play is prepared for the stage or for private reading.

Medicoliterary Notes.

A new volume of essays by G. K. Chesterton is to be published shortly by Dodd, Mead & Co. It will bear the title *Fancies Versus Facts,* and will deal with all sorts of things, from lawyers to cavemen, and from psychoanalysis to free verse.—*New York Times.*

* * *

Children Astray is the title of a volume by Saul Drucker and M. B. Hexter to be issued in the near future by the Harvard University Press. It consists of a collection of case studies of the delinquent children and their successful care and treatment in an institution for orphans.

* * *

Robert Keable, author of *Simon Called Peter* and of *The Mother of All Living,* is reported to have gone to the island of Papeete, Tahiti, where he is living in the house that originally belonged to the artist, Paul Gauguin, and working on a new novel.

* * *

During the year 1922 rats to the number of 21,590 were destroyed in Greater New York through the efforts of an antirat campaign planned to rid the water front, warehouses, markets, restaurants, and other places where foodstuffs are handled and sold, of these dangerous pests. In this connection it is of interest to quote briefly from a recent report of the British Incorporated Vermin Repression Society, in which it is estimated that Great Britain's rats cost her forty-two pounds a minute. "A method of rat repression that has met with considerable success in recent years is one based on the method devised by Rodier for the reduction of the large rabbit population in Australia. Rodier killed all the does he could capture, but the bucks he released. There are certain resemblances between rabbits and rats from which it might be expected that this method . . . would succeed in the case of rats. In both cases the males are in excess, the usual proportion in the case of rats being ten males to three females. The fathers in both cases show a tendency to eat their offspring, especially when the proportion of males is increased. Thus Rodier's method, by encouraging cannibalism and by forcing the females to compete for their food supply with an excess of vigorous males, is a powerful deterrent to successful breeding."

* * *

A comparative study of the reath rate in thirty-four states of the health registration area, including eighty-two per cent. of the country's population, made by the Census Bureau, shows that New York State alone has a mortality of 21.8 in each hundred thousand of its population. This compares with 16.6 in each hundred thousand of the total public in this area.—*New York Medical Week.*

* * *

The Illinois Society for Mental Hygiene has begun recently the publication of an interesting little sheet called the *Mental Health Bulletin.* It will be a monthly except that no numbers for July and August will be issued. The statement is made in the first number that the *Bulletin* will serve as a medium through which the activities of the Illinois Society for Mental Hygiene will be more intimately conveyed to members and others interested, and that it will contain "useful and reliable information on important aspects of mental hygiene, as well as news of interest. It is hoped especially to have the *Bulletin* reach teachers, clergymen, jurists, probation officers, social workers, nurses, physicians, state and local officials, and others who come in contact with groups of children and adults."

* * *

A recent number of the *American Journal of Public Health* contains an entertaining editorial on Fads in Medicine. Among those described is Bishop Berkeley's tar water, a mixture of a quart of tar and a gallon of water, reputed to be useful in many ailments of man and animals to relieve "tender nerves and low spirits, to improve children, and to relieve the British people of a tendency to "grow stupid or doat sooner than other people." Another of these miraculous fads was Dr. Elisha Perkin's metallic tractors, consisting of two pieces of metal about three inches long, blunt at one end, and sloping to a point at the other. These were patented and soon attained a remarkable popularity, not only in England, but in Europe and America. The tractors were used to "extract" from human bodies in a few moments the most violent pains. The son of the inventor in a few years saved more than ten thousand pounds from the proceeds of their sale in Great Britain alone. No wonder Couéism is successful!

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Mr. Clifford W. Beers, secretary of the National Committee for Mental Hygiene, and author of *A Mind That Found Itself,* sailed recently to attend a mental hygiene conference to be held in Paris.

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A bill which would prohibit the use of white lead and sulphate of lead in the internal painting of buildings, with certain exceptions, has been recommended by the Third International Labor Conference of the League of Nations, and is being prepared by the Belgian Ministry of Labor. The Municipal Council of Liège has adopted resolutions prohibiting the use of white lead in inside and outside painting work done for the municipality.—*Lancet* (London).

Practical Therapeutics

PAIN AND ITS TREATMENT IN THROMBOANGITIS OBLITERANS*

By Charles Goodman, M. D., F. A. C. S.,
and
Julius Gottesman, M. D.,
New York.

Pain, the predominating symptom in thromboangitis obliterans, is of the greatest concern to both the doctor and the patient in so far as it does not readily respond to the usual forms of treatment. The severity of the pain and the danger attendant upon the continued use of morphine and its derivatives necessary for its alleviation, is too well known to occasion further comment. We know of no symptom complex in which more methods have been tried for the relief of this predominating symptom.

The many brilliant results reported by various observers obtained in chronic inflammatory joint conditions with foreign protein injections, suggested to one of us (Goodman), the possibility of this form of treatment in thromboangitis obliterans.

The commonly accepted view of thromboangitis obliterans is, that it is a chronic inflammatory process beginning in the peripheral bloodvessels, the resulting symptoms and physical signs depending upon the loss of circulation in the affected parts. We assumed that the same theoretical considerations that bring about relief in chronic inflammatory joint conditions might obtain in thromboangitis obliterans.

With this object in view a group of definitely proved cases of thromboangitis obliterans was selected from the surgical service of the Montefiore Hospital. The cases, four in number, had had amputations at various times with pathological confirmation of the clinical diagnosis. The most pronounced symptom in all of them at the beginning of this investigation was severe pain, necessitating heroic medication with morphine or its derivatives, at most times ineffective. To this group another case of clinically observed thromboangitis obliterans of eight months' duration was subsequently added.

The plan followed was as follows: A series of injections of the stock typhoid vaccine distributed by the New York Board of Health was given, beginning with the minimum dose sufficient to produce a mild reaction (temperature, pulse, malaise, joint and bone aches and pains). Typhoid vaccine was decided upon because of its convenience, its relative safety and the ease with which it could be administered. Intramuscular doses were given at weekly intervals, gradually increasing the dose at each injection sufficient to produce mild symptomatic reaction.

The most striking result obtained was the sustained relief of pain in all cases, sufficiently complete to obviate any further necessity for medication with morphine or its derivatives. In one instance, Case II, there was a return of pain because of onset of gangrene in the toe. All the cases are still under observation.

Case I.—N. G., Russian, tailor, admitted May 14, 1921. The chief complaint was pain in the left hand. One sister had had Raynaud's disease. The disease began seven years ago with itching sensation and pain in right middle index finger. A year and a half later the tips of the left toes became cold, followed in two months by gangrene. Amputation of left lower extremity was done two months later. The right leg was amputated one year later because of pain.

Physical examination showed the left lower extremity amputated through the middle of the thigh, the right leg amputated through junction of upper and middle thirds of leg. Left hand bluish and cyanotic; skin of fingers glossy and thinned. Left radial pulse smaller than right. During the patient's stay in the hospital he complained of constant pain in the left hand. On November 9, 1921, there had been no relief from any form of treatment. On December 10, 1921, a series of intramuscular typhoid injections was begun, starting with one quarter c. c. The injections were continued at weekly intervals until March 17, 1922, the largest dose being two c. c. The pains in left arm were entirely checked, and have continued so to date.

Case II.—A. G., Russian, aged fifty-four, peddler. The chief complaint was pain in the left foot. The trouble began fifteen years ago with pain in the big toes, first right and then left. Gangrene began to develop, and was checked by baking. There had been more or less pain on and off for fifteen years. On April 21, 1921, the right leg was amputated because of severe pain. He was admitted to the hospital because of pain in the left foot.

The physical examination showed the right lower extremity had been amputated through the lower third of the thigh. The left foot was swollen and cyanotic. Neither the popliteal, dorsalis pedis or anterior or posterior tibial arteries could be felt. Because of the intensity of the pain, a series of subcutaneous injections with Ringer's solution, starting December 3, 1921, were given. No relief was obtained. On January 19, 1922, typhoid injections were begun, starting with one half c. c. Injections were continued until March 17, 1922, with relief of pain. The patient was entirely free from any pain until in the early part of January, 1916, pain developed following an accidental cut with a pair of nail scissors. The gangrene spread so rapidly that the extremity had to be amputated.

Case III.—D. S., Russian, aged forty-nine, furrier, admitted June 17, 1921. The chief complaint was pain in the right hand and right stump. The present illness began in 1910, with a feeling of fatigue in both arms and legs following exertion. During the summer of 1911 he began to experience numbness in the toe of the left foot and heel of right foot. Two years after the onset there developed sharp continuous pain and sensation of coldness in the outer part of the left foot. In March, 1913, a left arteriovenous anastomosis was performed without relief from the pain, followed by an amputation through the left thigh, in April, 1913. One

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*From the Surgical Service of Montefiore Hospital, New York City. Received for publication on September 22, 1922.

year later there developed pain in the right middle and index fingers and right big toe. Under treatment with hypodermoclysis the condition subsided. During the early part of January, 1913, pain developed in the right toe, with gangrenous sloughing. The pain continued in the right toes until October, 1919, when the right extremity was amputated through the lower third of the leg. January, 1921, an ulceration developed of the right stump, with severe pain around the ulceration.

The physical examination showed the left lower extremity amputated through the middle of the thigh; right extremity through lower third of leg. The left radial pulse was smaller than right. Because of the severe pain and developing gangrene in the right stump, amputation was performed August 12, 1922, through the lower third of the thigh. September 1st the patient began to complain of pain in the fingers of the left hand, sufficiently severe to require constant medication with morphine. On December 17, 1921, a series of typhoid injections was begun and continued until March 17, 1922, the largest dose being one and three quarters c. c. The pains steadily diminished and the patient has been free from pain to date.[1]

We do not understand as yet just how foreign protein injection brings about this relief from pain; whether the protein acts by producing an inflammatory reaction in the bloodvessel sufficient to diminish the existing thrombus or whether it mitigates the vascular spasm, are theoretical possibilities. Suffice it to say that the results obtained are sufficiently encouraging to warrant the further use and observation of this form of medication. All the cases cited above are still under observation.

It is hoped that this tentative report will encourage other observers to test the merits of protein injections in this condition, so that sufficient data may be obtained to determine the real merit of this form of therapy.

266 West End Avenue.
129 East Sixty-ninth Street.

Management of Diphtheria. — E. Charles Fleischner and Edward B. Shaw (*Medical Clinics of North America,* September, 1922) call attention to the following important diagnostic points which are characteristic of diphtheria: 1, a tonsillar exudate that spreads beyond the tonsil; 2, any exudate in the throat associated with aphonia, hoarseness and laryngeal cough; 3, progressive aphonia, hoarseness and laryngeal cough without exudate; 4, a sanguineopurulent or sanguineous discharge from the nose, with or without a membrane, but associated with toxemia; 5, all doubtful cases should be considered as cases of diphtheria as regards treatment, especially in the presence of pronounced signs of intoxication. The taking of smears from the exudate must not be neglected, as often a diagnosis may be made immediately. The important points in the differential diagnosis are: 1, quinsy occurs rarely in children; 2, peritonsillar abscess is usually unilateral; 3, the edema and swelling develop more rapidly in severe diphtheria than in peritonsillar abscess; 4, the exudate spreads to the pharynx or palate in diphtheria; 5, a peritonsillar abscess either follows follicular tonsillitis or it starts in the deep tissues around the tonsil, pushing it forward; 6, quinsy is more painful; and, 7, severe diphtheritic swelling and edema usually marked swelling of the regional lymph nodes and periglandular edema, which is rare in peritonsillar abscess.

In treatment, single large doses of antitoxin are preferable to repeated smaller injections. The intravenous route is the best except in, 1, status lymphaticus; 2, hypersensitiveness to horse serum (anaphylaxis), in the presence of which, as shown by the history and the intracutaneous test, the patient should be desensitized; 3, patients showing an unusual colloid reaction. Intramuscular injections may be given in mild cases, but severe cases require intravenous therapy. The dose of the antitoxin should be gauged by the age of the patient and the severity of the disease. If the first injection is insufficient, a second dose should be given. Absolute rest in bed is necessary and the process of getting up from bed should be gradual. Morphine or codeine hypodermically, or opium suppositories are useful in mental excitement and in early cases of myocardial degeneration. Local treatment is indicated in, 1, excessive pain in the throat; 2, mechanical obstruction, especially in the nose, and 3, laryngeal involvement, for which purpose hot saline irrigations are advisable. Frequent uranalyses aid in determining the prognosis.

The Treatment and Prognosis of Leprosy.— P. Harper (*British Medical Journal,* July 8, 1922) advocates the intravenous injection of crude chaulmoogra oil, sterilized by heat. He says that from five to fifteen minims of the oil at body temperature are injected once, twice, or three times daily. His plan is to give a fortnight's rest at the end of each four weeks' injections. The treatment is maintained until a treatment reaction occurs, when it is stopped until the reaction is over. He used to give the oil intravenously in a mixture with ether and iodine, or carbolic, but found the crude oil as above to be more satisfactory. During the last two years 35,000 intravenous injections of chaulmoogra oil have been given at Makogai. Syphilis, compensated heart disease, tuberculosis, and the filarial diseases are not necessarily contraindications. In cases of albuminuria without casts the albuminuria is lost during treatment with this method. Chaulmoogra oil was first given intravenously by Verham, Stevenel, and Noc. They gave it in fine emulsion; but their doses were very small, being about one hundredth to one fortieth of the doses given by the author. Nevertheless they obtained good results. Chaulmoogra oil is so unpleasant to take by mouth or subcutaneously that for years efforts have been made to find an unirritating active principle. One of the earliest of these was antileprol, rediscovered recently and much praised as the ethyl esters or Dean derivates by the Hawaiian leprologists. Another rediscovery is Sir Leonard Rogers's sodium hydnocarpate and gynocardate, the sodium salts of hydnocarpic and gynocardic acids, which were used twenty years ago by Roux. These derivatives of chaulmoogra oil seem to act in precisely the same way as the oil itself, over which they possess no real advantage.

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[1] A report of Cases IV and V will appear in the author's reprint.

Abstracts from Current Literature

SYPHILIS AND ITS TREATMENT.

Early Diagnosis and Treatment of Syphilis.—K. Ullman (*Wiener klinische Wochenschrift,* December 7, 1922), discusses very thoroughly the difficulties of the early diagnosis of syphilis, especially with extragenital primary lesions. The proper technic in the procuring of the material and of the method of its examination are very important in the search for spirochetes. The best results are secured with the dark field examination of the fresh, unstained specimen. The light dark field condenser is dispensable for the general practitioner. A negative finding gives no definite information. Gland puncture may give some valuable aid. Inasmuch as the Wassermann reaction is negative during the first six weeks, it is unavailable for the diagnosis of syphilis during that time, but it is important in the determination of whether or not the infection has become generalized in the organism. In seronegative syphilis, cures may be achieved in one hundred per cent. of the cases with a powerful combined course of neosalvarsan and mercury or a simple course of neosalvarsan treatment. The author emphasizes the importance of examining all suspicious lesions for the presence of spirochetes. The induration of the base of the lesion may be absent, especially if the seat of the lesion is atypical.

Syphilitic Aortitis.—Eugene Sterling Kilgore (*Medical Clinics of North America,* September, 1922) reports some of the less common types of pain encountered in syphilitic aortitis—sharp effort pain in the back, pain in the upper left quadrant, and darting epigastric pain on lifting. There may also be early heart symptoms even in the absence of pain and also vague gastric symptoms. The signs of aortic regurgitation usually appear suddenly in the absence of a complicating mitral disease. Aortic stenosis is rare. Saccular aneurysm, a late manifestation, may be painless and devoid of the usual signs. The earliest physical signs depend upon the stretching, thickening and stiffening of the aortic wall, including such signs as dilatation of the veins of the neck or the pulsation of tortuous carotids, prominent subclavian and suprasternal pulsation with upward cardiac displacement; also inequality of the carotid pulsations, tenderness in the suprasternal notch, pulsation beside the manubrium, especially on the right side and dullness over and beside the upper part of the sternum. Aside from the diastolic aortic regurgitant murmur, the most important auscultatory sign is the modified second aortic sound (*le bruit de tabourka*). Fever is uncommon. Earlier lesions may be demonstrated by the x rays, which should be used in every case. The röntgenogram shows simple bulging of the ascending limb of the aortic arch to the right of the sternum, just above the curve of the right auricle on the two meter plate. The Wassermann reaction is positive in sixty to ninety-five per cent. of the cases. Life may be prolonged with the proper treatment and the author believes that intensive arsenical treatment is justified. The antisyphilitic treatment is begun with mercury, which is followed by minimal doses of neosalvarsan (0.2 gram), gradually increased at five day intervals up to 0.9 gram. After a month of salvarsan treatment, mercury is again given by inunctions or injections for a month, alternating in this way every month for six months. A period of rest is then given for six months, which is then followed by another course of six months' treatment, after which the patient is kept under observation without further treatment unless it is specially indicated. Potassium iodide in small or moderate doses is given during the periods of other treatment.

Cellular Blood Reaction and Individualizing Treatment of Syphilis.—As a result of his experiments, J. Kyrle (*Wiener klinische Wochenschrift,* October 19, 1922), asserts that the adequate aid of the organism is of the greatest significance in the final result in every therapeutic procedure in advanced syphilis and that we can estimate to a certain extent the reacting power of the organism by the form of the reaction of the blood picture. He found that the individual differences in the cellular reaction of the blood in syphilis and in the antisyphilitic procedures are by no means slight and that in individual cases timely variations in the capacity for reaction play an important part. The appearance or absence of leucocytosis in connection with a certain therapeutic procedure should be considered as evidence to show whether that particular organism is in a state of favorable or unfavorable resistance toward the infecting agent or not. Kyrle also found that a comparatively mild treatment is sufficient in cases with a primary leucocytosis, or those in which there is strong reaction to injections of sodium nucleinate or similar remedies. Some cases of syphilis react to every specific or nonspecific treatment with a leucocytosis, others react only at the beginning of the treatment, while others do not react at all. This capacity of reacting seems to correspond with the therapeutic result and it also seems proper to take this phase of reaction into consideration when administering specific remedies and to refrain from such treatment in the presence of a leucocytosis.

Syphilis and Its Visceral Manifestations.—L. B. Cowen (*American Medicine,* June, 1922) makes the following pertinent statements regarding syphilis and its visceral manifestations: When it is recalled that syphilis, almost from its inception, is a septicemia, the source of entrance of the organism into the blood being the initial lesion, it is not hard to understand its remarkable and variable symptoms and lesions. It is known that a general septicemia exists at least three or four weeks before secondary lesions appear. The lesions of syphilis, unlike those of tuberculosis which they resemble remarkably, do not progress indefinitely. Both local and general acquired immunity play an active part in limiting the growth of the organisms and the development of the lesions. Wile's classification of the disease into early and late syphilis depends upon the fact that the lesions of early syphilis are superficial, with no serious interference of function, while those of late syphilis are deep, tend to undergo ulceration and necrosis, with serious interference of function in vital organs. The viceropathies of early syphilis give few subjective symptoms, although spirochetes are present in every viscus. When the roseola is on the skin, a similar condition is present in the viscera, as has been shown at autopsy. Syphilitic aortic insufficiency causes less hypertrophy of the left ventricle than endocarditis, because the coronary arteries are affected in the former, giving the heart muscle less nourishment. Angina pectoris is often due to syphilis of the coronary arteries. In late gastric syphilis there may occur a catarrh, round ulcer, submucous gumma, diffuse infiltration and cicatrices. In specific ulcer there is usually a diminished acidity, instead of an increased acidity which is found in nonspecific ulcer. Most cases react well to antisyphilitic treatment. Syphilis should be considered carefully in all cases of rectal disease. It should be ruled out in all cases of fistula in ano, ischiorectal abscess, ulcerations about the rectum, as well as in all cases of suspected carcinoma and tuberculosis.

Local Wassermann Reaction in the Early Diagnosis of Primary Syphilis.—D. Stern and Harold Rypins (*Journal of Laboratory and Clinical Medicine,* November, 1922) recommend the use of the local Wassermann reaction carried out on the surface serum of a suspected primary lesion as a practical and valuable aid in the early diagnosis of primary syphilis. Where no dark field microscope is available, or where the spirochetes are not found, or a lesion has been treated with a spirocheticide, the local Wassermann test as an additional means of diagnosing primary chancre may establish the diagnosis before the blood becomes positive. Thirty-four cases of demonstrated primary chancre and two with proved nonluetic lesions were studied. The Wassermann test on the chancre sera of the thirty-four cases was positive in all instances. The majority of these patients at the time the local Wassermann was done gave negative blood tests, and had no secondary manifestations. In all cases 0.0125 c. c. of the serum and in some cases only 0.004 c. c. was sufficient to give the positive result. The authors found that local treatment of the lesions with a spirocheticide apparently had no effect on the complementfixing bodies, though the spirochetes may disappear.

Arsenical Preparations in the Treatment of Syphilis.—Abr. L. Wolbarst (*International Journal of Surgery,* June, 1922) states that a recent investigation made by a committee of German physicians showed that the chance of fatal result in a properly given injection is about one in 13,000 with old salvarsan, one in 20,000 with sodium salvarsan, and one in 162,800 with neosalvarsan, an average of one fatality in 56,445 injections. Many physicians today believe that in the various refining processes salvarsan has lost in antiluetic potency. On the other hand, some believe that the drug has not lost any of its power, but that the treponema has developed strains that are resistant to arsenic and therefore to arsphenamine medication. Obviously it is impossible to offer positive proof on either side of this question, but the fact remains that we do not get the results with one injection of arsphenamine today that a similar dose effected in 1910 or 1911. Of the six methods of injection, i. e., intravenous, intramuscular, subcutaneous, oral, rectal, and intraspinous, the intravenous is best for routine therapy. It has been the practice of the author for the last seven or eight years to protect his patients against possible recurrence in such cases by advising a form of insurance that has been very satisfactory in his experience. The insurance consists of neoarsphenamine injections administered three or four times a year, especially in cases in which there is a fear of neurorecurrence. The author states that there has not been a single recurrence of any kind in any patient who has taken this insurance systematically. In concluding, Dr. Wolbarst reminds us that the two remedies, arsphenamine and mercury, are powerful poisons and that caution must be taken to consider possible susceptibility or idiosyncrasy.

Treatment of Syphilis with Trépol.—Rudolf Rosner (*Wiener klinische Wochenschrift,* November 23, 1922), states that the French bismuth preparation trépol produces a prompt symptomatic effect. The spirochetes disappear after forty-eight to seventy-two hours (in contrast to a period of twenty-four hours with salvarsan). The effect on the Wassermann reaction is slower than that with salvarsan. A Herxheimer reaction was observed in twenty-five per cent. of cases of secondary syphilis. All of the patients showed a slight bismuth stomatitis; intestinal symptoms occurred comparatively often; frequently there were also slight injuries of the kidneys (cylindruria). In more than half of the cases treated a leucocytosis was found after the injection, which was not followed by any reaction; rises of temperature are rare as is also the loss of weight.

Syphilitic Serum Reactions.—K. Taoka (*Japan Medical World,* May 15, 1922) draws the following conclusions from his experiments: The specific substance for Wassermann reaction in syphilitic serum is carried away with the flakes of Sachs-Georgi's reaction in a certain ratio. By the removal of the flakes from the syphilitic serum, the remaining serum becomes negative to Wassermann's and Sachs-Georgi's reaction tests.

The flakes of Sachs-Georgi's reaction are dissolved by fresh serum or alkaline solution.

The flakes of Sachs-Georgi's reaction combine with complements.

The ability of the flakes of Sachs-Georgi's reaction to combine with complements.is destroyed by a concentration above n/100 of alkaline or a concentration above n/100 of alkaline or n/400 of acid. The resistance of the flakes against the ions is the same as that of the syphilitic reactive substance of a serum.

The flakes of Sachs-Georgi's reaction can be divided into ether soluble and non-soluble parts.

When the antigen is added to the nonsoluble part it gives the specific Wassermann and Sachs-Georgi's reactions. Thus it corresponds to the syphilitic reactive substance of the serum. As far as tested, it did not give albumin reactions.

The ether soluble part is composed of sufficiently active antigen.

Each part, which was separated and became comparatively pure, can be recombined and gives a specific reaction.

When the serum globulin is precipitated by 33 of the saturation percentage of ammoniacal sulphate solution, the syphilitic reactive substance is almost entirely removed into the precipitate. Only a part of it is removed with the globulin precipitated by the other methods.

When a syphilitic serum is heated the Wassermann reaction is weakened, but Sachs-Georgi's reaction, on the other hand, is strengthened.

The Sachs-Georgi's reaction is strengthened by the removal of a part of globulin of an unheated syphilitic serum.

Globulin separated from an unheated serum either syphilitic or nonsyphilitic, has a strong anticomplemental action in the Wassermann reaction. This action of the globulin is destroyed by heating it before or after the separation. It is thermolabile.

The weakening of the Wassermann reaction by heating a serum is not due to the destruction of the reactive substance, but due to the disappearance of the anticomplemental action of globulin.

The Wassermann reaction with an unheated serum is liable to give a nonspecific positive reaction.

An unheated globulin prevents the precipitation in the Sachs-Georgi's reaction. This preventive action is destroyed by heating. It is thermolabile.

The reason why an unheated serum does not give a precipitation reaction is due to this preventive action of globulin.

The preventive action of unheated globulin differs with the complemental action of a serum. It seems to depend on the physicochemical action of globulin.

Therefore a heated serum should be used in Wassermann and Sachs-Georgi's reactions.

Ten Cases of Delayed Congenital Syphilis.—E. D. Spackman (*Lancet,* July 8, 1922) describes ten cases of delayed congenital syphilis, the age of eight of the patients (soldiers) varying between twenty-one and twenty-three years and two (civilians) being sixteen and seventeen years old respectively. The age incidence of these cases is high and very unusual, as this condition usually becomes manifest at the second dentition or at puberty. In the group of eight patients, there were no signs of a syphilitic breakdown until they engaged in strenuous work at the age of nineteen or over. Four of the group were classed as fit for active service at the front and six of them were actually serving at the front when the syphilitic symptoms appeared.

The author raises two questions: 1. Would these men have manifested the symptoms of congenital syphilis at home without engaging in strenuous work? 2. What was the active factor in the breakdown? A study of the histories of these cases shows: 1. That delayed congenital syphilis is not readily cured. 2. That the neoarsphenamines (novarsenobillon and neokharsivan) speedily clear up the local lesions. 3. That a permanently negative Wassermann reaction cannot be produced by treating these cases. 4. That every congenital syphilitic has a positive Wassermann reaction before treatment and that it remains so throughout life. 5. That there is no age limit at which a relapse cannot occur. 6. That arduous work with mental strain may cause a congenital syphilitic taint to become manifest in an apparently healthy person.

An early and thorough treatment, lasting for two years, should be administered in all cases of congenital syphilis. The persistence of the positive Wassermann reaction is of no great significance, as all of the soldiers led useful lives in spite of the presence of the positive Wassermann reaction since birth; two were married and had healthy children. Patients with obvious congenital syphilis should be given no arduous labor to perform. Delayed congenital syphilis is not a rare occurrence. Aortitis or aneurysms may have a congenital origin and need not be the result of acquired syphilis. All syphilitics should receive competent and thorough treatment. Diseases of the eye, such as interstitial keratitis, iritis, or choroiditis, are important elements in the early diagnosis of syphilis.

Wassermann and Sigma Tests Compared in 569 Cases.—W. T. Collier (*Lancet,* August 5, 1922) found that the sigma test is slightly more reliable and more delicate than the Wassermann reaction; also that it is less complicated. A reading of one to four sigma units only must be regarded as doubtful. If obtained on more than one occasion, it is probably evidence of syphilis. Subsequent tests were also carried out, in which the readings were recorded after seven and after twenty-four hours' incubation. The longer incubation is a great aid in assessing the value of the sigma reading of less than four units (after seven hours' incubation) since a true positive will give a considerably increased degree of flocculation after the longer period. Of 387 cases, thirty-one gave a reading of less than four units; of these twenty-seven, which were all clinically positive or from known treated cases of syphilis, gave such increased flocculation after the longer incubation; four, which were all clinically doubtful, gave no such increased flocculation.

Formalin Test for Syphilis: Some Conditions Controlling Gel Formation.—A. G. Holborrow (*Lancet,* August 5, 1922) found that when serum forms a gel with formalin, it is due to the direct action of the reagent upon serum albumin or serum globulin, or both, and not to any action upon the toxins of the Spirochæta pallida direct. It is probable that the acid protein produces a gel with formalin and that alkali protein does not. The formation of a gel in this case is an indication of decreased alkalinity of the serum, but it does not determine the cause of the decreased alkalinity. The author, therefore, considers the evidence as sufficiently adverse to regard the formalin test for syphilis with reserve.

ENDOCRINOLOGY.

Blood Supply of Thyroid. — E. V. Mastin (*Surgery, Gynecology, and Obstetrics,* January, 1923) states that: 1. The thyroid has a very rich arterial and venous blood supply. 2. There is an extensive anastomosis not only between vessels of the same lobe, but also with those of the opposite lobe. 3. In the event of ligation of all four thyroid vessels the circulation can be reestablished through extraglandular anastomosis. 4. The secretory activity of the thyroid gland is under nerve control. 5. After ligation of the superior thyroid artery a polar ligation should be made in order to cut off the veins, lymphatics, and remaining nerve filaments. 6. Control of hemorrhage is best accomplished by interrupted mattress sutures placed through the remaining gland tissue, by ligation of all bleeding points, and by the use of gauze packing in the wound. 7. Bleeding veins can often be demonstrated by having the patient strain or cough before the wound is closed.

Treatment and Prophylaxis of Endemic Goitre.—Wagner-Jauregg (*Wiener klinische Wochenschrift,* April 20, 1922) asserts that the use of cooking salt containing two mgm. of an iodine salt (potassium or sodium iodide) to the kilogram serves to prevent the occurrence of endemic goitre. This form of treatment has the advantage of acting on the whole population in goitre districts, beginning at the moment of reproduction (intrauterine effect) and also of acting continuously throughout life, independently of individual endeavor.

Pubertas Precox.—John L. Tierney (*The Medical Clinics of North America,* July, 1922) states that precocious puberty or macrogenitosomia precox has been attributed to disturbed function of various endocrines, notably the gonads, adrenal cortex and pineal gland. The most common etiological factor is hypergonadism, with the involvement of the adrenal cortex and the pineal gland next in frequency. In the male, the sexual precocity may be produced by neoplasm and hyperplasia of the testes, suprarenal cortex and pineal gland; in the female, mostly by hyperovarianism, rarely the pineal. Probably most of the cases of masculinity rather than true feminine precocity are cases of hypertrichosis, male countenance, mustache, beard, hypertrophied clitoris, etc., without true secondary sex characters or precocious menses. In cases of hypersecretion, surgery is indicated for tumors; in hyperplasia or hyperactivity, properly directed radiation or suitable endocrine therapy are indicated.

Relation of the Thyroid Gland to the Female Pelvic Organs.—C. M. Wilson and Aleck W. Bourne (*Lancet,* May 27, 1922) present the following conclusions: 1. The basal metabolic rate in most pregnant women, but not in all, is raised above that normally found in nonpregnant women. 2. This basal metabolic rate of different pregnant women varies considerably, but no relationship between these variations in the rate and the clinical condition of the mother is traceable. 3. In the majority of patients, the rise of the basal metabolic rate disappears after delivery, but in a certain number of cases this does not happen, but persists abnormally. The excessive thyroid secretion may produce menorrhagia without pelvic signs. 4, A high basal metabolic rate is also associated with certain forms of menorrhagia, with absence of demonstrable pelvic abnormality. These cases are resistant to all ordinary medicinal and operative measures, but respond readily to exposure of the thyroid gland to x rays. 5. The disappearance of pelvic symptoms is coincident with a fall to the normal basal metabolic rate. Large doses of x rays are not necessary. In a series of cases the patients were treated with initial doses of ½ B or 5 X to each lobe of the thyroid once a week for three doses, the filter being one mm. of aluminum and four layers of wash leather. After that, doses of ⅘ B were given once in three weeks through a filter of 3.5 mm. aluminum and wash leather as before. The rays should not be hard, with a reading not less than 9 on the Bauer qualimeter. The tube used was a Coolidge medium focus, the average doses being seven to eight. Erythema of the skin must be avoided. To avoid the development of myxedema, it is advisable to test the basal metabolism again after six exposures. In some cases more than eight exposures are required, but the necessity for such increased treatment must be determined from time to time by the basal metabolism.

Further Studies Respecting the Pathological and Clinical Significance of Diffuse Adenomatosis of the Thyroid Gland.—E. Goetsch (*Endocrinology,* January, 1922) gives in greater detail the symptoms and pathology of the condition already described by him as diffuse adenomatosis. The patients are mostly women between twenty and thirty complaining of asthenia, fatigability, loss of weight and strength, nervousness of varying degrees, labile pulse with mild tachycardia, tremor, perspiration, vasomotor instability, mental depression and worry, and often a slight elevation of temperature. They do not present the cardinal signs of adenoma and exophthalmic goitre. Nothing peculiar is noted about the eyes. The thyroid gland is often slightly or moderately enlarged, but when palpated is fairly firm, elastic, and shows no nodules, having, however, a granular or lobulated feel. There is an increased vascularity on section and the cut surface bleeds profusely. The gland contains a diminished amount of colloid, thus distinguishing it from the thyroid of simple colloid goitre. Quite the opposite from the condition in colloid goitre, puberty hyperplasia, and exophthalmic goitre, microscopic examination shows the striking and characteristic change to be a marked increase of interstitial cells, with associated atrophy and almost complete disappearance of colloid acini. These interstitial cells, Goetsch believes, produce a secretion which causes the colloid acini to atrophy, and this fact, taken with the abundance of mitochondria found, leads him to consider diffuse adenomatosis a milder form of thyroid adenoma. Treatment consists of resection of approximately three fourths of each thyroid lobe, and considerable success has been attained in a small series of cases.

Existing Views of Thymic Function.—E. Bonilla (*La Medicina Ibera,* February 25, 1922) begins with a description of the histology of the thymus as at present known, then enters into a brief but excellent summary of the views of a great number of recent investigators as to the function of the thymus. The enumeration fully justifies his concluding paragraph: "As may be seen from this review, we know nothing certain about the physiology of the thymus, nor whether it ought to be included or not among the glands of internal secretion, for modern investigations do not seem to demonstrate the absence of an endocrine function with any such degree of definiteness as American authors do."

Adrenal Enlargement in Rabbits.—T. L. Squier and G. P. Grabfield (*Endocrinology,* January, 1922) in an effort to determine the mechanism by which thyroid feeding causes an enlargement of the adrenal glands, fed desiccated thyroid extract by the method of intubation to rabbits, to rabbits whose splanchnic nerve had been severed, to rabbits severely and to those mildly traumatized. The results attained are summarized in the statement that trauma or stimulation will produce an adrenal enlargement of apparently the same kind as that resulting from thyroid feeding, but that the same trauma or stimulation plus thyroid will produce still greater enlargement. The enlargement in all cases was largely, if not entirely, cortical.

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SURGERY.

The Radical Cure of Hemorrhoids: Modified Whitehead Operation.—John O'Connor (*British Medical Journal,* May 13, 1922) describes his modification and technic:

1. Limit primary dilatation to the insertion of the right index finger in search of polyps, ulcer, etc.
2. Apply pressure forceps at the junction of the skin and mucosa to each of the four cardinal points of the anal circle.
3. With adjoining forceps held in opposing traction, make a rapid incision with a straight blunt pointed scissors until the skin is completely detached.
4. Apply another pressure forceps to the cut edge of the latter between each of the four forceps originally placed.
5. Grasp the eight forceps in the palm of the left hand, insert the left index finger into the rectum and cut lightly around with scissors until the external sphincter appears well in view.
6. The cutting must be done below and external to it until the Whitehead adit (submucosa) is exposed.
7. With the maneuvre mentioned in paragraph 5 continue cutting the attachments to the muscular coat until the hemorrhoidal cylinder can be peeled out by a blunt dissector.
8. Make a vertical slit in the protruded cuff up to the level of the "supra-Morgagnitic" circle; commence a continuous Triollet catgut suture at the apex of the slit, drawing the "red" mucosa into accurate apposition with the skin; then cut transversely, a half inch at a time, at that level and carry on the continuous suture; all spurting vessels should be immediately ligated.
9. Introduce a morphine suppository and a slender roll of dry gauze into the rectum, apply a dry gauze dressing and change daily.
10. On the fifth morning give the patient one ounce of castor oil, sponge the parts after each stool with warm permanganate solution, add a warm permanganate sitz bath, and reapply dry dressing.
11. On the seventh morning the nurse inserts the right index finger annointed with zinc and boracic ointment into the canal to educate the patient to do the same for two months. Any remaining tags are snipped off under eucaine on the ninth day.

Anesthesia in Pelvic Surgery.—W. R. Meeker (*Surgery, Gynecology, and Obstetrics,* December, 1922) states that the efficiency of nerve block anesthesia can be determined only in the absence of deep preliminary narcosis, terminal infiltration, and inhalation anesthesia. Transsacral nerve block with a low epidural injection gives absolute anesthesia of the pelvic floor and viscera in practically all cases. The technic requires practice and patience for mastery, but may be rapidly improved by experiment on the human cadaver and skeleton. The difficulty of execution of nerve block and the delay in the appearance of anesthesia may be obviated by having the anesthesia induced in a separate room especially equipped for the purpose and the injections performed by one skilled in this branch of work. The amount and strength of the anesthetic solution employed should be in proportion to the general condition of the patient and the probable size of the sacral foramina and nerve trunks. In addition to its high degree of safety to the patient, transsacral anesthesia creates as favorble an operative condition for the surgeon as general narcosis. The trouble and consequent loss of the surgeon's time during operation when local infiltration is employed is thus avoided. Many operations have been performed under this method which would have been impossible with peripheral infiltration or the field block methods.

Anesthetics in Common Operations.—Dudley W. Buxton (*Practitioner,* January, 1923) gives several good suggestions. He assumes that in most cases ether will be employed by the drop method from start to finish, following nitrous oxide gas, or after some other preliminary anesthetic. A hypodermic injection of one one hundredth grain of atropine an hour before the anesthetic is given obviates excessive secretion from the glands of the respiratory tract and should be given to all except very young children. Frequently it is wise to associate with the atropine one sixth grain of morphine and one one hundredth grain of scopolamine, but the latter should not be given for brief operations and should not be given unless the patient can be watched by a nurse. After morphine or scopolamine has been administered the patient should be kept absolutely quiet in a darkened room, without talking or moving, and carried to the operating table, otherwise he is likely to be roused and become faint. Flooding the eyes with castor oil as soon as the patient is sufficiently under the anesthetic not to notice, and then covering them, will prevent conjunctivitis from the ether vapor. Overdoses are productive of exhaustion of the respiratory and circulatory systems, severe vomiting, persistent nausea, hiccough, headache, and other bad effects, but seldom produce observable symptoms during the inhalations. Pulmonary aftereffects follow. In fractures and dislocations there is a common but inaccurate belief that chloroform produces greater muscular relaxation than ether; the former does relax muscles more rapidly, but the latter ultimately produces a more complete muscular flaccidity.

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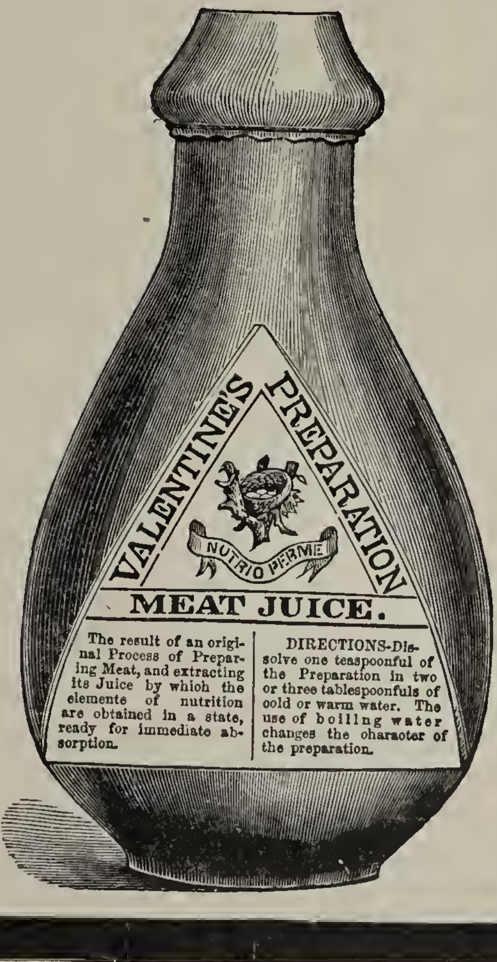
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Collectanea.

Diagnosis of Pulmonary Tuberculosis.—Louis Hamman (*Southern Medical Journal,* July, 1922) says that the results of treatment in this disease vary directly with the earliness of the diagnosis. Unfortunately, the natural progress of the infection makes it impossible for the physician to detect all cases at an early stage, for many pass at a stroke from health to an advanced stage. In those which begin more gradually, accurate diagnosis requires all the means of investigation that can be summoned. Not the history alone, nor the physical examination alone, nor the x ray alone, nor the sputum alone, nor tuberculin alone, can solve the problem. He who uses one of these methods to the exclusion of the others is sure to come to grief. Indeed, with all of them at hand, final judgment is frequently difficult and sometimes impossible. The great obstacle is the prevalence of tuberculous infection. We have no way to distinguish in the large group of infected those about to develop manifest tuberculous disease. We must look to the future in the hope that we may learn something of the concatenation of circumstances that lights a latent focus into active disease.

Guaiacol in the Treatment of Tuberculosis.—M. Gustave Dirner, (*Gyógyászat,* 61:334), Budapest, July 10, 1921. Instead of using the common guaiacol preparations, which irritate the stomach lining, dissolving with difficulty and passing into the intestinal canal unchanged, Dirner tried a new hemoglobin guaiacol preparation, which is sold under the trade name of Guaiaglobin. Tablets containing 0.05 gm. guaiacol and 0.20 hemoglobin are well tolerated by the stomach, encourage the production of secretion, improve the appetite and counteract night sweats. The hemoglobin constituents may serve as blood producing agents. In reported cases of early pulmonary tuberculosis, the preparation never failed to improve the prevailing condition.

A New Symptom in Diseases of the Lung and Pleura.—E. Fröschels and F. G. Stockert (*Wiener klinische Wochenschrift,* June 1, 1922) systematically investigated the finding that in cases of pneumonia, a pronounced vowel is heard by the auscultating ear over the affected region as an entirely different vowel, as, for example, the vowels *a, o, u* may sound like the vowel *e.* The observer invariably hears another vowel than the one pronounced. This phenomenon depends upon the intensity of the phonation in such a way that, with an increase in the intensity, the sound became indistinct or disappeared entirely; it occurs only over pneumatic foci and their surroundings, but never over normal tissues. However, over exudative pleurisy and over thickened pleura the changed vowel sounds were not heard. A series of ten pneumonia cases examined, all showed different vowel sounds than the ones pronounced. Frequently, these changed vowel sounds varied within a few minutes or disappeared entirely.

This phenomenon is explainable by the assumption that one vowel is changed to another, when semitones are either added or taken away as a result of the action of the bronchi as resonators—some increase the vocal cord tones and others produce harmonic semitones. As a result of the pneumonic process, some of the resonators are occluded, thereby preventing the access of certain semitones; it is also possible that new semitones may arise in the foci described.

This explanation is further complicated by the fact that interference phenomena may occur in the chest, when semitones are transmitted by way of the thorax and the healthy portions of the lung, and others by way of the diseased portion. This also accounts for the vowel changes in pleuritides, in which case, the compression of portions of the lung might play a similar part.

Biologic Activators.—K. Kottmann (*Schweizerische Medizinische Wochenschrift,* July 13, 1922) with the aid of his photoserologic method, was enabled to show that the reaction depending upon the distribution of the serum colloids is retarded by the addition of normal and carcinomatous organs. In his subsequent investigations, he found that a number of typical vitamin donors (extract of beetroot, wine, codliver oil, etc.) also produce a retardation. This effect depends upon the presence of active substances having the nature of activators—endogenic organic vitamins in normal and carcinomatous organs and exogenic activators in the added extracts. The organism also contains antivitamins, which act as moderators with the aid of which there results a balance under physiological conditions; this results in a regulation of the various nutritional and growth processes. When these processes are disturbed, specific disease pictures appear. In carcinoma there results an abundance of growth activators, thus producing the neoplasm.

Eclampsia in the Late Puerperium.—Bianca Bienenfeld (*Zentralblatt für Gynäkologie,* June 24, 1922) reports a case in which a woman (para-II) developed a puerperal septic endometritis in the early days of the puerperium following an operative interference for the purpose of terminating a normal pregnancy. She was treated with intravenous injections of electrargol which successfully terminated the puerperal process; six days after the appearance of the septic phenomena an eclampsia with a subsequent psychosis developed on the twelfth day of the puerperium. A venesection was followed by recovery.

In making a differential diagnosis it was possible to exclude epilepsy (by the history and the development and recession of albuminuria), hysteroepilepsy, intoxication and organic cerebral disease (by the rapid recovery). In spite of the absence of the usual symptoms associated with uremia, the author considered this case to be one of uremia following acute diffuse glomerulonephritis—a condition rarely described in the literature. The injection of electrargol can be eliminated as an etiological factor in the eclampsia. Owing to the absence of lactation and a possible injury of the liver and intestine by the febrile process, the author also thought of a disturbance (with an existing predisposition to eclampsia) of the lipoid metabolism, in which the threshold limits are overstepped, with the resulting development of convulsions.

Constipation in Young Girls and Women—

especially those who spend much time indoors engaged in sedentary pursuits—is almost invariably attended by a retention of waste and toxic substances. Sooner or later these make their way from the bowel into the general system and give rise to a host of autotoxic ills.

Correction of this condition is imperative, and the safest, simplest and most effective remedy for the purpose is

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Directions:

To relieve the constipation of young girls and women, give two to four teaspoonfuls of INTEROL morning and night, increasing or decreasing the quantity as conditions require. As the bowels yield to the action of INTEROL, gradually cut down the dose to the least amount that—taken at bedtime — will assure a daily evacuation.

a pure mineral oil of the proper density and viscosity to assure satisfactory lubrication of the intestinal canal, and thus relieve and correct bowel inactivity without the usual disagreeable effects of cathartics as commonly employed.

Besides lubricating the canal, INTEROL renders the feces soft and plastic, thereby promoting their easy passage and evacuation with gratifying freedom from discomfort and distress.

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The Clinical Aspect of Postoperative Eclampsia.—H. Thaler (*Zentralblatt für Gynäkologie,* June 24, 1922) reports a case of eclampsia occurring during the latter part of the puerperium. A fever developed on the fifth day of the puerperium and gradually rose until the patient became comatose on the ninth day postpartum, when two typical eclamptic attacks occurred at three hour intervals. The patient's general condition improved during the next two days, when there was another rise of temperature with clouding of the sensorium, paralytic and sensory disturbances of the extremities, right facial paralysis and strabismus, which were followed by death on the twelfth day postpartum. The necropsy revealed cerebral changes in the form of a total thrombosis of the greater falciform sinus and of both transverse sinuses and circumscribed hemorrhages and softenings in the medullary layer of both frontal lobes; also croupous endometritis of the placental site and embolism of the right pulmonary artery and thrombosis in the region of the pelvic veins. On reviewing a series of 472 cases of eclampsia, including eighty-one postpartum cases, only three similar cases were found, occurring eighteen, twenty-two, and thirty-nine hours postpartum. Those cases occurring a short time postpartum seem to be more favorable prognostically than those occurring later. The latter are characterized particularly by the occurrence of severe posteclamptic psychoses and more frequent epileptic attacks. Most of the posteclamptic psychoses occurring in cases characterized by the severity of their course and high mortality were those occurring later than three hours postpartum and those pastpartum eclampsias occurring during the first three hours postpartum were characterized by a very mild course and low mortality. Excellent results in the treatment were achieved with venesection, although chloral hydrate, morphine and the Stroganoff treatment were also given.

Eclampsia: Evolution as a Causative Factor.—S. E. Kark (*British Medical Journal,* June 10, 1922) bases his theory on the following facts: 1. All the changes occurring in pregnancy are functional. 2. All pregnancies are not quite normal, as evidenced by the functionless changes. 3. Owing to the tardiness in evolution of the placental form of reproduction, pregnancy approaches, in some degree, primitive conditions, as evidenced by the secondary feminine characteristics of the pregnant woman being less marked and the approach to the masculine type in many respects, such as the overgrowth of hair, coarsening of the features, thickening of the skin, hypertrophy of the bones, enlargement of the hands and feet and stability of calcium metabolism. Another result of this physiological atavism of pregnancy is the survival of the state of hyperpituitarism in pregnancy. This is shown by the fact that the physiological requirements for gestation are stimulated by the hormone from the anterior lobe of the pituitary and the pathological changes are due to its overactivity. In the later stages of pregnancy, the hormone of the posterior lobe stimulates the physiological requirements and the pathological changes are due to the hyperactivity of the posterior lobe plus the morbid changes due to the anterior lobe hormone. The prodromal symptoms of eclampsia are due solely to the overactivity of the anterior lobe, the pre-eclamptic symptoms are due to the overactivity of both the anterior and posterior lobes, while the eclamptic symptoms are due to oversecretion of the posterior lobe only.

The symptoms (prodromal) due to the anterior lobe are practically the same as in acromegaly, namely nervous irritability and unbalance, vomiting and epigastric pains, headaches, somnolence and cramps and twitchings of muscles. The preeclamptic symptoms are due to hypertrophy of both parts of the gland. The anterior lobe produces objective symptoms of pressure on the neighboring centres and nerves, as on the optic nerve and chiasm, producing symptoms of disturbed vision. The preeclamptic symptoms from overactivity of the posterior lobe are increased blood pressure and urinary changes, such as oliguria, high specific gravity, albuminuria, blood and hyaline, epithelial and granular casts; the eclamptic symptoms are tonic and clonic convulsions from contractions and spasms of the cerebral bloodvessels from the pressor action. The pathological anatomical findings corroborate these clinical symptoms by showing evidence of irritation in the posterior lobe of the pituitary, the brain, liver, and the kidneys. Eclampsia is therefore not due to any accidental external agent, nor is it the result of a morbid derangement producing poisons or toxins from either the fetus, uterus, or the intestine, but it is essentially a physiological process overdone—an excess rather than a perversion of an essential product. This is due to the comparatively short evolutionary experience of nature with the placental form of reproduction.

Chorionepithelioma.—Herbert A. Black (*Colorado Medicine,* June, 1922) maintains that the frequency of this disease should warn every physician to be on the alert in cases of persistent bleeding after the termination of pregnancy, especially if it is of the pathological type, for the heavy mortality incident to this form of tumor, though rare, makes it highly desirable that the diagnosis be made at an early stage. In no other class of malignant cases is there so apt to be a mistake in diagnosis at the onset of the symptoms, which results in delay until the disease has made such progress as greatly to increase the mortality and render operative measures all but useless. Clinical symptoms may be sufficiently diagnostic to justify operation in the absence of laboratory findings. Abdominal hysterectomy is the operation of choice, and this is not contraindicated by metastases.

Treatment of Asylum Dysentery by Means of Antidysentery Serum.—P. Lornie and D. Ellis Jones (*British Medical Journal,* June 17, 1922) report unprecedented results in the treatment of dysentery in institutions with serum prepared by injecting horses with cultures of Shiga, Flexner's and Kruse's bacilli. The amounts of the serum used varied between twenty and forty-five c. c. (usually twenty-five c. c.) which were injected subcutaneously in the ten cases reported. Apart from the rapid clearing up of the blood and mucus and the cessation of the diarrhea, the rapid fall in the temperature and the immediate and marked physical improvement were striking features.

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If it does what you want it to do as a systemic tonic in overcoming functional weakness and bodily depression, and does it more promptly, uniformly and satisfactorily in case after case, than any other remedy, you will naturally continue to use it. If it fails, you certainly will not.

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Whenever the **Stomach** from any cause **Rejects Food** or **Medicine, Valentine's Meat-Juice** demonstrates its **Ease** of **Assimilation** and **Power** to **Restore** and **Strengthen.** In low forms of **Pneumonia** and **Exhaustion,** in the **General Debility** and **Depressing Prostration** following **Influenza** it is recommended by many practitioners throughout the world as invaluable in their treatment.

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The result of an original Process of Preparing Meat, and extracting its Juice by which the elements of nutrition are obtained in a state, ready for immediate absorption.
DIRECTIONS-Dissolve one teaspoonful of the Preparation in two or three tablespoonfuls of cold or warm water. The use of boiling water changes the character of the preparation.

Pneumonia *and* Influenza.

William H. Peters, M. D., *Admitting Physician, Camp for Consumptives, State of Rhode Island, Providence, R. I.:* "VALENTINE'S MEAT-JUICE was the only nourishment retained by my five-year old daughter during an attack of Pneumonia. I consider that it saved her life and believe it to be the best product of its kind."

Cavalier Dr. Enrico Ballerini, *Late Surgeon to the Hospital of Rome, Italy:* "I have used VALENTINE'S MEAT-JUICE in the treatment of patients, and also personally, after having been very ill with Influenza, and I must say it is an excellent tonic in conditions of great organic weakness. It is also very agreeable. I have prescribed it with the greatest satisfaction for convalescents and invalids restricted to a liquid diet."

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Medical College Founded at Jerusalem.—The Jewish Physicians' Committee of the World Zionist Organization, acting in cooperation with the Palestine Foundation Fund, and consisting of Dr. Nathan Ratnoff, chairman, with Dr. David Kaliski and Dr. Samuel J. Kopetsky, have recently returned from Palestine, after several weeks' stay, where a site of about thirty acres on the Mount of Olives was acquired for the establishment of the Medical College of the Hebrew University at Jerusalem. Some $300,000 have already been subscribed by physicians of the United States for the establishment of the school. A building has been rented as temporary quarters for a school for research in tropical diseases and plans have been completed for permanent buildings, on which actual work will be begun as soon as the rainy season is over. Dr. Ratnoff reports the absolute need of research work in the endemic diseases and in scientific sanitation as most urgent. Instruction in medical studies will be entirely in the Hebrew language which will enable native students to continue to matriculation in a medical college at home, where, heretofore, for lack of such facilities, they have been compelled to go abroad for this purpose. The Medical College will be directed by a Board of Governors, one half of the members of the Board to be appointed by the Physicians' Committee, the other half by the World Zionist Organization. Included on the Board of Governors are the following American physicians: Dr. S. S. Goldwater, Dr. Israel Strauss, and Dr. Leon Louria. Representatives of the World Zionist Organization are Dr. Chaim Weizmann, Prof. Otto Warburg, Dr. R. Solomon, and Dr. M. D. Eder.

Rockefeller Institute Extension.—Announcement was made a few days ago of the purchase by the Rockefeller interests of another whole city block, from Sixty-third to Sixty-fourth Street and fronting on the East River, for future enlargement of the Rockefeller Institute for Medical Research. The first purchase of the property, which now embraces five entire blocks on the East River, was made by John D. Rockefeller in 1903, when he acquired the three blocks bounded by Sixty-fourth and Sixty-seventh Streets, Avenue A and the river, part of the original William C. Schermerhorn farm. No streets were cut through east of the river at the time of this purchase. The first street to be opened was Sixty-seventh, the block between Sixty-seventh and Sixty-eighth, Avenue A and the river being intended as a site for the Presbyterian Hospital. When the more ambitious plans of association of the Presbyterian Hospital with the College of Physicians and Surgeons of Columbia University was adopted, this site was abandoned and a location in Washington Heights acquired, leaving the former for future development of the Medical Institute for Research. The entire property with its hospital, laboratories and other buildings is valued at about two million dollars for assessment purposes, though about half of it—that part occupied by the medical buildings—is exempt from taxation. The cornerstone of the first structure was laid in December, 1904, by Dr. Simon Flexner, then, and continuously since that date, chairman of the Board of Governors. The attention of the medical world will naturally be directed to the future development and expansion of the activities of the institute by reason of the fact that the interests controlling these activities are willing to provide every facility for placing the Rockefeller Institute in the foremost place among the world's greatest medical research organizations.

Child Welfare Organizations Unite.—The two national organizations engaged in promoting the health of the chlidren of this country have voted to unite under the title of American Child Health Association. The two organizations as heretofore known, are the American Child Hygiene Association and the Child Health Organization of America; both have been devoted primarily to promoting the health of children. For thirteen years, beginning with the formation of the American Association for the Prevention of Infant Mortality, there has been a group of physicians, nurses, and others interested in child health, who have built up throughout the country organized groups of workers to carry out measures known to be sound in the preservation of the health of mothers and of babies in the matter of child hygiene work. The membership has grown from an original of 917 to its present membership of 2,047, and in the number of State Bureaus of Child Hygiene from twenty-nine to forty-seven.

An Interesting Hospital Site.—The Bronx Hospital has just purchased land for the construction of a new main building which has an interesting history. It was sold by Indians in 1648 to Col. Robert Morris, whose heirs held it until 1848; there was then one conveyance to James Herold, from whom the John Eichler Brewing Company bought it something over fifty years ago. It has never changed hands since. With this addition to their holdings the Bronx Hospital has a total frontage on Fulton Avenue of 211 feet and an increase of its present holdings of 151 feet on 169th Street. The old buildings will be used for a maternity hospital, nurses' training school, and dormitories.

French Doctors Visit America.—A delegation of members of the faculty of the medical school of the University of Strasbourg, Alsace, have come to the United States as the guests of the Rockefeller Foundation for the purpose of studying the organization and methods of American medical schools. The visiting commission is made up of the dean, Dr. Georges Weiss, professor of biophysics, and six other influential members of the faculty, representing both laboratory and clinical branches—Dr. Léon Blum, professor of clinical medicine, Dr. Paul Bouin, professor of histology, Dr. Camille Duverger, professor of ophthalmology, Dr. P. Masson, professor of pathological anatomy, Dr. Maurice Nicloux, professor of physiological chemistry, and Dr. Lucien Pautrier, professor of dermatology and head of cutaneous diseases clinic. After a brief stay in New York members of the commission, following their special interests, will visit a few of the leading institutions for medical teaching and research in the United States, among them the Rockefeller Institute for Medical Research; the College of Physicians and Surgeons, Columbia University; the Cornell Medical School; the Johns Hopkins Medical School; the Harvard Medical School; the medical schools of the University of Pennsylvania, the University of Michigan, the Washington University, St. Louis; and the hospitals affiliated with these institutions.

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Dr. Julian Calleja, *Pres. Royal Academy of Medicine of Madrid, Spain:* "It is with the greatest satisfaction I inform you that I consider VALENTINE'S PREPARATION OF MEAT-JUICE to be of a very superior order for invigorating the nervous system, for which I use it myself and prescribe it to my patients."

John Tanner, M. D., LL. D., *Senior Physician Farringdon General Dispensary for Diseases of Women and Children, London, England:* "In cases of Flooding or Hemorrhage of any kind, Fevers, low forms of Pneumonia, Extreme Exhaustion when the stomach is too irritable to retain any ordinary preparation, then VALENTINE'S MEAT-JUICE will be found to be a perfect God-send. I cannot speak too highly of it, as I have found it of such immense advantage to me in the treatment of the most anxious and serious cases under my care."

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Miscellany.

Ten Years of Intravenous Therapy in General Practice.—John Howard Frick (*Medical Review of Reviews,* July, 1922) cured a case of advanced, virulent and generalized streptococcus infection, in which all other methods of treatment failed, with thirty intravenous injections of one gram of sodium salicylate in twenty c. c. of sterile distilled water, given every eight hours. In all types of pneumonia, pleurisy with or without effusion, and generalized infectious, socalled rheumatism, either muscular or articular, he obtained excellent results with the intravenous injections of one to two grams of sodium salicylate dissolved in twenty c. c. of sterile water, given every eight to twelve hours. Ten cases of anemia were treated with sodium salicylate, one half to one gram in ten c. c. of water, injected intravenously every third or fourth day. It increases the hemoglobin and red blood cell count. Another series of ten cases were treated with iron and arsenic. In sixteen cases of severe and persistent chronic arthritis, responses were obtained from the injection of two grams of sodium iodide in twenty c. c. of sterile water, given at five or seven day intervals or until signs of iodism appear. In acute cases this dose was given every eight to twelve hours. This treatment is also effective in Berger's disease, indolent ulcers, asthma, chronic headache and in diseases with connective tissue proliferation in the bloodvessels, viscera, or in and about joints. Urotropin, one half to one gram dissolved in ten c. c. of water, given either alone or in combination with one gram of sodium salicylate (requiring twenty c. c. of water) is effective in pyelitis, otitis media, mastoiditis, pneumonia, and in pleurisy with effusion. In endarteritis obliterans, not too far advanced, a two per cent. solution of sodium citrate in eight ounces volume, given intravenously every third or fourth day, is practically a specific.

Echinococcus Anaphylaxis. — Johann Hugo Botteri (*Wiener klinische Wochenschrift,* May 25, 1922) asserts that hydatid fluid should be considered as a true antigen because with it both active and passive anaphylaxis may be produced and also because with a characteristic shock the hypersensitive organism may be desensitized. Man can be easily sensitized with a single subcutaneous injection of two to five c. c. of the antigen and sometimes even by repeated intracutaneous inoculations of 0.1 c. c. of the antigen, but with the intravenous route it is difficult and can be accomplished only with large doses; with oral administration, enormous doses are required. The hypersensitiveness was tested with intracutaneous inoculations of 0.1 to 0.2 c. c. of sterile hydatid fluid. After eight to ten days, the intracutaneous reaction becomes positive in the form of an erythema and infiltration of the skin as large as a five crown piece.

The antigen keeps for months if hermetically sealed and mixed with two per cent. chloroform. The intracutaneous reaction in patients with echinococcus disease is striking with the use of 0.1 to 0.2 c. c. echinococcus cyst contents injected in the form of a wheal. On the day after the injection there may be an erythema the size of the palm of the hand and swelling of the skin, usually associated with a marked subcutaneous inflammatory edema, which may be extensive. The edema increases for forty-eight hours and usually recedes completely on the fourth day. Only a skin infiltration of at least five to six cm. diameter, especially when associated with a simultaneous subcutaneous edema, is recognized as a positive reaction. A temporary edema occurs chiefly when the echinococcus cyst is suppurating, but the reaction returns as soon as the patient recovers from the operation.

With this test very small cysts can be diagnosed. The duration of the hypersensitiveness may be many years, even though the patient is clinically well. The artificial hypersensitiveness lasts about four weeks. It is possible to transmit a passive anaphylaxis to other persons, requiring, however, large doses (one hundred to two hundred gm.). After intravenous antiserum injections, the passive anaphylaxis appears on the next day, but it is soon lost; with subcutaneous injections, the passive hypersensibility appears on the fifth day, but lasts longer. A local passive tissue anaphylaxis could not be developed. Antigen antibody formation, desensitization after long continued intracutaneous reactions and a weakening of the reaction cannot be induced. Larger doses are undesirable because they produce necrosis. For purposes of desensitization, the author used the intravenous route and he carefully injected very small doses in the beginning in order to produce a slight shock in cases of spontaneous and artificial hypersensibility.

In hypersensitive persons, immediately after the injection there is a congestion of the head, reddening of the conjunctiva, occasionally vertigo, and after a few minutes a general urticaria, especially marked at the site of the previous cutaneous reaction; there is also a true recrudescence of the old reaction, including those incited with antigen, both when it does and when it does not contain albumin; there may also be vomiting and tenesmus, slight rises of temperature and traces of albumin and urobilinogen in the urine. Absolute desensitization against the intracutaneous reaction occurs in three to seven days. The urticaria recedes in one to two hours after the shock and the patient is entirely recovered.

The shock may also be produced by antigen which was boiled for a short time, provided the albumin is not precipitated as a result of the alkaline reaction. Antigen not containing albumin (in animals) does not produce the shock. The eosinophilia in echinococcus disease is an anaphylactic symptom.

Two Hundred and Twenty-five Cases of Pneumonia.—Ambrose W. Owen (*British Medical Journal,* June 17, 1922) reports a mortality of 14.2 per cent. in his series of cases of pneumonia. The usual treatment of milk, beef tea, albumen water and plenty of cold water until after the crisis was given. He considers the most useful drug to be ammonium carbonate, giving five grains every four hours to adults and one grain for an infant of one year and proportionally according to age. Patients who were treated with strychnine and digitalis died. These drugs seem to be more useful in cardiac debility following the crisis. Morphine was given only to adults. The hypodermic injection of morphine he believes to be harmful.

Sluggish Bowel Action in Childhood

is usually due to errors in feeding. Subjecting these fundamentals to the customary careful correction,

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may be administered coincidentally to relieve the immediate condition.

This pure, tasteless and odorless mineral oil—notably free from the greasiness common to such products—has proved of exceptional value as a safe and dependable means of moving the bowels of young children, and this without the griping, straining and after-constipation by which the use of castor oil and other drastic cathartics is so frequently attended.

The constantly-growing number of physicians who prefer INTEROL to any other media in the routine management of constipation in early life is its own best endorsement.

Dosage in Children

Begin with a half to one teaspoonful, 3 times a day before meals. Increase or decrease dose until one good movement is obtained daily. Then gradually decrease to the point where a small dose at bedtime will maintain this result.

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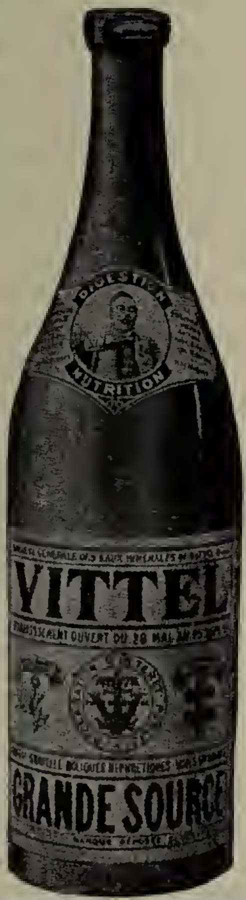

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Tuberculosis of the Eye.—F. Dimmer (*Wiener klinische Wochenschrift,* May 11, 1922) asserts that there is a close relationship between the eye and the disease, tuberculosis. An extensive trial of tuberculin therapy has shown that many tuberculous eye conditions are amenable to it. There is no reason for the objection to it on the parts of both the medical profession and the laity. A more extensive use of tuberculin therapy is urged.

A Case of Antrochoanal Polypus of Exceptional Size.—W. G. Dawson (*Lancet,* June 3, 1922) reports an antrochoanal polyp, weighing 9.5 drams, which had been present for several years. It was a globular glistening, pearl colored, firm growth, filling the entire pharynx and bulging the soft palate forward; its lower limit was seen only with difficulty by strongly depressing the tongue. Respiration and deglutition were impeded remarkably little. There were no symptoms except a peculiar muffled speech and suffocation when the patient turned on his back during sleep.

Hibbs's Operation.—S. Widere (*Norsk Magazin for Laegevidenskaben,* September, 1922) describes the operation and quotes Hibbs's own results from the treatment of spondylitis by this method. The operation is indicated in: 1. Tuberculous spondylitis; 2, pronounced, progressive kyphoscoliosis, obstinate to other treatment; 3, painful, traumatic conditions, in fractures and dislocation, and in 4, spondylolisthesis. Widere has operated in seven cases of tuberculous spondylitis with seemingly good results, also one patient with continuous pain, localized to columna and originating in a trauma. One case of marked kyphoscoliosis, and one of spondylolisthesis are at present under observation, but not yet operated upon. Hibbs's operation is recommended.

Close Relationship of the Erythrogenetic and Leucogenetic Functions of the Bone Marrow in Disease.—Eugene P. Pendergrass and Henry K. Pancoast (*American Journal of the Medical Sciences,* June, 1922) define erythemia as a disease of the erythroblastic tissue of the bone marrow and report a case in which röntgen ray treatment proved efficacious. X rays destroy or inhibit the formation of red cells and are therefore indicated in the treatment of erythemia, and also in the treatment of secondary polycythemia when such cases fail to respond to treatment by drugs and venesection.

Swelling and Distention of the Areola of the Nipple During Pregnancy.—P. Sfameni (*Zentralblatt für Gynäkologie,* May 13, 1922) concludes that the swelling of the areola of the nipple depends upon neither an edematous infiltration nor upon other analogous conditions: this, as well as the greater spreading at the surface, depends upon the hypertrophy of the mammary gland. The diagnostic significance of the swelling of the areola of the nipple and of its increased size is pronounced. The swelling and spreading of the areola at the surface also has a prognostic value, as it is due to an intensive hypertrophic activity of the mammary gland. In fact, the conclusion can be drawn that the function of the mammary gland will be abundant during the period of lactation.

Transmission of Hypersensibility in Human Beings.—A. de Besche (*Norsk Magazin for Laegevidenskaben,* September, 1922) succeeded in producing passively hypersensibility to horse albumen (horse serum) in the skin of quite normal individuals, in three out of fifteen cases, by intracutaneous injection of serum from asthmatic patients, whose asthma was distinctly due to sensibility to horse. This sensibility was only of a local character, however, as other portions of the skin not injected gave no reaction. The same antigen (horse serum) which injected subcutaneously or intravenously into the asthmatic patients would cause a severe general reaction, produces when injected intracutaneously into this isolated hypersensitive local area of the normal individual the sister disease to asthma, i. e., urticaria. These experiments may help to throw more light on what must now be considered as anaphylactic types of asthma.

Bleeding Mammæ and Their Relation to Cancer.—J. K. Hald (*Norsk Magazin for Laegevidenskaben,* August, 1922) concludes that the most frequent cause of this rare condition is new growth of the mammæ. Other causes are disorders of menstruation and an inflammatory condition of the mammæ. Among the benign growths accompanied by this symptom may be mentioned cyst adenoma and intracanalicular papilloma. In the latter bleeding of the mammæ often constitutes the only visible symptom. In cancer, bleeding of the mammæ is reported in one to nine per cent. of the cases, but as malignant cancer is of much more frequent occurrence in the breast, than benign growths, bleeding will always arouse a suspicion of cancer. The only treatment of bleeding mammæ when caused by new growth, whether benign or malignant, should be operative, as benign tumors may undergo malignant degeneration.

Embolism and Thrombosis of Superior Mesenteric.—E. Klein (*Surgery, Gynecology, and Obstetrics,* October, 1921), from a study of cases, concludes that: 1. Occlusion of the mesenteric vessels is most often effected by an embolus or a thrombus. 2. Experimentally, by varied disturbances of the intestinal blood supply, there may be produced lesions varying from limited necrosis of the mucosa to extensive infarction of all the intestinal coats. The milder lesions are not fatal and heal completely. 3. It seems likely that these experimental findings are closely paralleled by the lesions in man. 4. Closure of the superior mesenteric artery in man may be followed by a, complete establishment of a competent collateral circulation which will, 1, persist effectively throughout the patient's life, or, 2, subsequently break down, usually because of aggravated disease of the heart or the bloodvessels; b, intestinal obstruction without infarction owing to a blood supply sufficient for life of the parts but not for function; c, intestinal infarction, with the injury varying through all stages from a moderate lesion of the mucosa to pronounced necrosis of the intestinal walls. 5. Following obstruction of the trunk of the artery the third effect noted above is the most common. 6. Following obstruction of a branch the first effect is the most common. 7. A favorable outcome without operation does not exclude the diagnosis of embolism or thrombosis of the superior mesenteric artery.

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Miscellany.

Pharmacology of Benzyl Compounds.—Carl Nielsen and John A. Higgins (*Journal of Laboratory and Clinical Medicine,* November, 1921) state that all the benzyl esters investigated produced relaxation of intestinal muscles, lowered the blood pressure, and depressed the respiration in a manner corresponding in a general way to the action of benzyl benzoate as demonstrated by Macht. There seems to be a correlation of benzyl hydrolysis and smooth muscle relaxing property in the series of benzyl esters investigated, with the exception of the salicylate and acetyl salicylate, in which the rate of hydrolysis to give benzyl alcohol is not a criterion of pharmacological action. Of the twelve benzyl compounds tested, benzyl acetyl salicylate appears to be the most powerful intestinal relaxant, and benzyl salicylate is also very efficient.

Observations on the Pharmacology of Some Benzyl Esters.—Carl Nielsen and John A. Higgins (*Journal of Laboratory and Clinical Medicine,* April, 1921), using the method described by Jackson, obtained marked intestinal relaxation following injections of relatively small amounts of benzyl benzoate and benzyl cinnamate. The latter produced a greater intestinal relaxation than the former in equal amounts. Benzyl cinnamate lowered the blood pressure less than benzyl benzoate. These results are not in accord with those of Mason and Pieck, who report a negligible effect, or none at all, on the intestine, although the method was somewhat different. Benzyl cinnamate is a solid compound at ordinary temperatures, readily melting at body temperature, and like benzyl benzoate, virtually noxtoxic when administered orally. After repeated injections of large doses of benzyl esters into the blood stream, the authors noted that the arterial blood becomes very venous in appearance, but no difference in the coagulation time of such blood was recorded, as compared with normal arterial blood from the same animal.

The Danger of Epidemics in Europe and What Is Being Done to Prevent Their Spread.—C. Näslund (*Hygeia,* September 15, 1922), after studying the statistics of epidemics in Europe during the war, shows how most of the infectious diseases spread from Russia to the Western European countries, though not to any appreciable extent until after the inner disorganization caused in these countries by the war. In 1919 and 1920 these epidemics reached their maximum. In 1921 there was a considerable decrease in the number of cases reported, except of cholera in Russia. This decrease must be attributed to the preventive measures instituted in some of the countries. Statistics are, however, not reliable regarding smallpox, dysentery and relapsing fever.

From the numerous reports from competent and reliable sources, it is safe to assume that the number of cases greatly exceeds that recorded in the statistics, and that in both Ukrania and Russia they have shown a rapid increase during the past year. In the famine districts, the cause of death is seldom recorded. That the spread of epidemics should become colossal in localities where neither soap, disinfectants, nor medicines are to be had is selfevident. The wholesale migration that is under way from Russia constitutes a great menace to the population of Western Europe. This migration is due partly to the hectic political conditions of Russia and partly to the horrible living conditions in that country. Of all the famine and epidemic centres of Russia, Ukrania doubtless presents the worst.

The sanitary regulations of Russia are ordered by the Public Health Commission, which includes a department for epidemics and also a department for prevention of disease. Local health departments are to be found in the various provinces. A similar organization is in charge of public health in Ukrania. Five conferences have been held by epidemiologists and bacteriologists in an effort to agree upon the best method of fighting the spread of these diseases. A sanitary cordon has been established along the Russian boundaries. The Warsaw convention also advised the quarantine of all vessels from Russia during the cholera months, i. e., June, July, August, and September. In Russia the hospitals are to be repaired, new hospitals erected, disinfecting and delousing stations distributed through the disease districts, and bacteriological laboratories supplied as well as disinfectants and medicines.

Immunological Study of Strains of Bacillus Pfeifferi Isolated from a Case of Meningitis.—Ruth A. Anderson and Oscar T. Schultz (*Journal of Experimental Medicine,* May, 1921) isolated five strains of B. Pfeifferi from a case of meningitis from the spinal fluid, blood, nose, throat and nasopharynx. These strains showed distinct immunological differences, those from the nose and nasopharynx being more closely related than any others, and some slight relation may have existed between the spinal fluid and the nose strains. The pathogenicity of the five strains for rabbits also varied. In spite of the immunological differences the authors believe that the strains are genetically related. The strain variations which have been noted by immunological methods do not support the theory of the etiological relation of this organism to epidemic influenza, unless it can be demonstrated that such variations are due to instability of the organism.

Experiments on the Specific Effect of Bacteriophages.—Oskar Bail and Tai Watanabe (*Wiener klinische Wochenschrift,* April 20, 1922) were able to show that the reproduction of bacteria and bacteriophages proceed independently of each other. This finding is of great importance and shows that the living but vegetatively resting bacillary body is not destroyed but that only the reproductively active part is destroyed. The reproductive process, the function of the bacterial hereditary part, must be inhibited so that the bacteriophagic effect may appear, which for this reason must be considered as autolytic with reserve. In fact the observation of cellular reproduction shows that as a result of the activity of the hereditary substance (chromatin) two kinds of processes are seen in the rest of the cell nucleus: the dissolution of the old nucleus with its covering and the associated development of two new ones. This can be interpreted that the chromatin becoming active has the power of dissolving the vegetative cell nucleus and secondly to cause its redevelopment.

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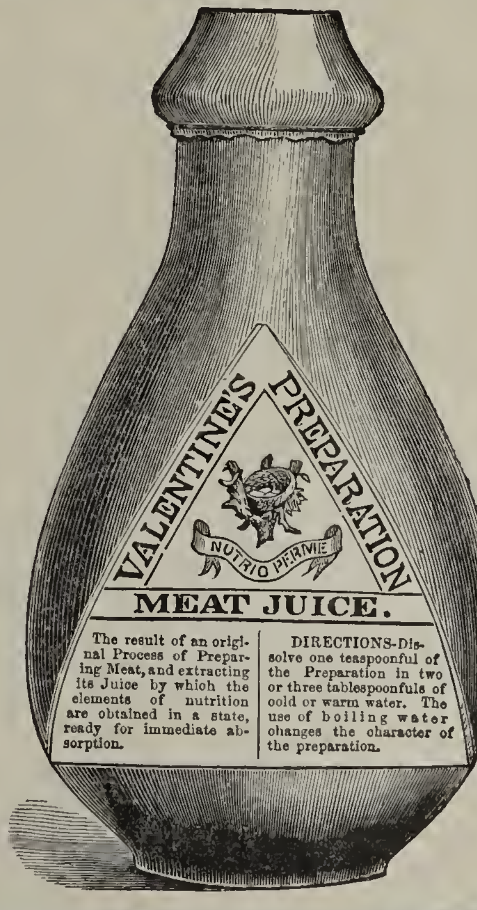
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Effect of Sodium Germanate upon the Total Hemoglobin of the Albino Rat.—Joseph E. Nowrey, Jr. (*Bulletin of the Johns Hopkins Hospital,* September, 1922) found that in rats injected with seventeen mg. of sodium germanate to the kilo of body weight there was a marked increase in the number of erythrocytes to the c. c. of blood, a moderate increase in the concentration of the hemoglobin, and a variable increase in the blood volume. There was no evidence of a concentration of the blood plasma in any of the animals. Nowrey draws the conclusion from these and previous experiments that the increase in the red cells of the blood of the rat following the injection of sodium germanate is in all probability due to a stimulation of the bone marrow and not an effect which follows a concentration of the plasma.

Night Sweats: Their Significance and Prevention.—Marcus Peterson (*Lancet,* July 29, 1922) suggests that the term night sweats is a misnomer and should be changed to slumber sweats, as the sweating may occur at any time when the patient sleeps. In the early stages of pulmonary tuberculosis and in the absence of any other infection, the sweats are often the only indication of the presence of an active tuberculosis. They do not occur a few weeks before death because the patient's resistance has been overcome. Various drugs have been recommended for slumber sweats, but these are unnecessary, as the sweats can be prevented without drugs, simply by having the patient sleep on a grass mat over the mattress or by sleeping without a mattress on canvas. The sweats are due to the presence of large amounts of bacterial products (toxins) in the blood; the sweats may appear in any bacterial disease and consequently they are not diagnostic of pulmonary tuberculosis, as is generally believed.

The Justification for Advising Birth Control in a Case of Idiopathic Amaurotic Idiocy.—E. Sachs (*Zentralblatt für Gynäkologie,* May 20, 1922) reports a case of Tay-Sachs's familial amaurotic idiocy. The mother sought advice as to the diagnosis and prognosis and also regarding the advisability of having another child. The child seemed normal when born but after six months it no longer showed fixation of the eyes and it became dull and unresponsive; the eyes wandered aimlessly and the head and extremities became gradually weaker. The diagnosis was established by examination of the eye grounds, which showed characteristic sharp limitation of the papilla, with a pronounced white discoloration, especially in the region of the macula; the retina was cloudy, with a light white ring and a cherry red spot (fovea) in its centre. These cases usually end fatally during the second year of life.

This disease frequently occurs without any known cause in several children of a family and almost always in those of Jewish parentage. It is due to an extensive degeneration of the entire central nervous system, with secondary atrophy of the cerebral and spinal nerves. The author asserts that the physician has no right to warn the parents of such children against further pregnancies. He should, however, explain to them that its occurrence may be repeated, but also that it is also possible that healthy children may be born; he must leave further pregnancies as a matter of choice to them.

Giant Centrospheres in Xanthomatous Tumors.—David T. Smith (*Bulletin of the Johns Hopkins Hospital,* September, 1922) studied seventeen xanthomatous tumors with special reference to the presence or absence of giant centrospheres. They were present in nine, or a little over fifty per cent. of the cases, and are probably to be regarded as evidence of degeneration.

Factor Determining the Spread of Red Marrow During Anemia.—Philip D. McMaster and Herbert Haessler (*Journal of Experimental Medicine,* December, 1921) conclude from their study on rabbits that the factor which determines the spread of red marrow during anemia is the presence in the body of hemoglobin, or perhaps of its precursors, in excess of the amount which can be utilized by the marrow already existing.

Effect of Age on Pancreatic Enzymes.—Frederic Fenger and Mary Hull (*Journal of Biological Chemistry,* May, 1921) report that powdered pancreas preparations which have been stored under ordinary conditions for one year deteriorated materially in their diastatic and lipolytic activity, some of the samples having become almost inert. The proteolytic activities of the same samples, however, were unchanged, indicating that trypsin occurring both in the desiccated natural gland and in the activated preparations, is the most stable of the pancreatic enzymes.

The Question of Arsphenamine.—Karl Wagner (*Wiener klinische Wochenschrift,* August 3, 1922) is of the opinion that the dangers of arsphenamine are underestimated and that it is no longer justifiable to refer patients to the neurologist for the purpose of obtaining material for extensive catamnestic experiences. The author sees the chief danger from arsphenamine in the necrotizing effect on the intima of the bloodvessels. He believes that this injurious effect on the bloodvessels, just like arteriosclerosis, may develop insidiously and become apparent only after decades.

Experiences with the Hecht Reaction.—Heinrich Kogerer (*Wienerklinische Wochenschrift,* July 20, 1922) was enabled to examine fourteen additional cases of morphinism with the aid of the Hecht skin reaction (the intracutaneous injection of very dilute solutions of morphine) the results of which substantiated the findings in former examinations. Twenty-four out of twenty-nine cases examined (82.75 per cent.) were hyposusceptible to morphine. During the period of abstinence a recurrence of the susceptibility to morphine was found in nine out of thirteen cases (sixty-nine per cent.).

Serious Reactions to Repeated Transfusions in Pernicious Anemia.—Harold M. Bowcock (*Bulletin of the Johns Hopkins Hospital,* March, 1921) reports three cases of pernicious anemia in which after a large number of transfusions extremely severe reactions occurred, following the transfusion of apparently compatible blood. The cases are reported chiefly to show the inadequacy of the present method of determining the compatibility of blood for transfusion, especially when the patient has had numerous earlier transfusions. Therefore, Bowcock feels that in some cases transfusion becomes self-limited and in such instances no attempt should be made at further transfusions.

Influenza and Broncho-Pneumonia

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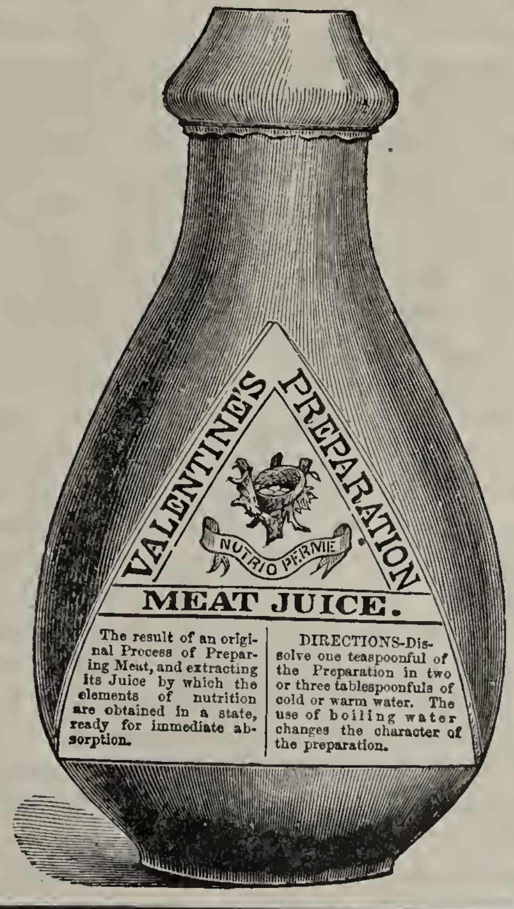

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Miscellany.

Colloidal Silver Salts.—Ballenger and Elder *Surgery, Gynecology and Obstetrics,* July, 1922) state that colloidal silver salts, notably the chloride, give off definite germicidal emanations. These emanations prevent the growth of microorganisms on Petrie agar plates in the immediate area surrounding the sealed glass tubes containing the colloidal silver chloride. A one per cent. preparation has a germicidal value about equal to pure carbolic acid, yet when sealed in the anterior urethra for five hours is without pain, even with much stronger preparations. No irritation is produced when applied to mucous membranes such as bladder, nose, throat and sinuses. Good results followed its application to abscess cavities, fistulous tracts, and also when used as a wet dressing for infected wounds, mastoid incisions, etc. Spermatozoa will live in a one per cent. preparation twenty minutes or longer. Being highly organized and delicate cells, this shows its relative harmlessness as a germicide. Diluted four thousand times, a five per cent. preparation killed the spirochætæ from a foul mouth in four minutes. Given intravenously to rabbits artificially infected with the staphylococcus aureus, one cubic centimetre of a one per cent. preparation cured the rabbits, sterilizing their blood within twenty-four hours, while controls, untreated, died within forty-eight to seventy-two hours with multiple abscesses of the liver, kidney, heart, and other organs.

Colloid Carcinoma.—D. Parham (*Annals of Surgery,* January, 1923), speaking of colloid carcinoma, concludes as follows: 1. In colloid carcinoma the epithelial cells possess an uncontrolled function of secreting a mucinous substance. Its accumulation is often destructive of the carcinoma cells. 2. Mucous formation is a sign of functional differentiation of the carcinoma cells, corresponding to the morphological differentiation seen in carcinomata with cells of the acinar or columnar type. 3. The mucus forming characteristics may be possessed by cells showing other morphological signs of differentiation and by those not showing such differentiation. 4. Colloid carcinomas occur in the stomach, 6.5 per cent.; cecum, 22.2 per cent.; appendix, 7.0 per cent.; transverse colon, 7.3 per cent.; sigmoid, 4.3 per cent.; rectum, 5.5 per cent; pancreas, two cases; gallbladder, 8 per cent; salivary glands, one case; bladder, 2.5 per cent.; prostate, one case; kidney, one case; ovary, 1.1 per cent., and breast, 1.12 per cent. Peritoneal carcinomata occur in 16 per cent. of all cases. 5. Colloid carcinoma is usually slow of growth and late to metastasize to glands and other organs. It often grows by permeation and may cause extensive thickening of the wall of the affected organ. 6. Local glands are often involved long before metastasis has reached distant glands. Though histologically less malignant on account of permeation of adjacent tissues, it is particularly difficult to eradicate. Death is often delayed, but the eventual mortality is greater than in other types of carcinoma. 7. Recurrence is often entirely localized to the site of origin. 8. Many patients with colloid carcinoma respond remarkably well to treatment by x ray and radium.

Chronic Universal Argyria After the Intravenous and Peroral Administration of Collargol.—Th. Tobler (*Schweizerische medizinische Wochenschrift,* August 3, 1922) reports the necropsy findings in a pronounced case of argyria following the oral administration of 0.84 gm. collargol for a month, together with thirty-eight tablespoonfuls of collargol solution and 75 c. c. of a two per cent. solution of collargol injected intravenously for cholecystitis and cholelithiasis. Most of the silver was found in the kidneys and liver; slight deposits were found in the spleen and pancreas and also in the esophagus and stomach and particularly in the intestinal tract and mesenteric lymph nodes; the tongue, soft palate, epiglottis, larynx, trachea, the large bronchi, lungs, heart and bone marrow were slightly impregnated. The cross striped muscle, nerves, cartilage and bones showed no silver granules. The uterus and particularly the bloodvessels of the tubes and ovaries showed fairly thick deposits; the same were found in the thyroid gland, especially in the interfollicular connective tissue of the lobulated portion and in the membrana propria of the duct acini of the breasts, as well as in the sweat glands of the skin. Most of the silver was in the bloodvessels, especially in the medium sized and small arteries, while the larger arteries showed no deposits. The hyaline membranes which form the framework of the glomeruli and the tunica propria of the urinary tubules and of many glands were markedly pigmented. The resorption of silver in the case reported proceeded partly from the gastrointestinal canal and partly from the vascular tract directly. With intravenous injections, a part of the silver remains in the body, especially in the Glissen capsule, the interstitial connective tissue of the pancreas, in the kidneys, spleen, bone marrow, etc. With proper doses a universal argyria need not occur; with a repeated course of silver preparations, a cumulative effect results. The duration of the administration need not be prolonged and the individual doses need not be large to produce argyria.

The Cause of Fluctuations in Respiration as Recorded by the Plethysmogram.—A. A. Weinberg (*Nederlandsche Tijdschrift v. Geneeskunde,* Haarlem, July 22, 1922) enumerates the following measurements recorded by the plethysmogram: 1. Respiratory arrhythmia, acceleration of the pulse on inspiration and slowing down on expiration; 2, decrease of volume of the bloodstream on inspiration and increase on expiration; 3, more pronounced dicrotism during expiration and decrease during inspiration; 4, the whole plethysmographic curve fell on inspiration and rose on expiration. There have been many attempts to demonstrate the relation between respiratory arrhythmia and vagus or sympathetic stimulation, and opinions vary as to the finer mechanism of the effect of respiration on the heart action. In the experiments, young healthy adult patients were chosen, as far as possible psychically and physically normal. It was observed that on inspiration the P and T waves rose and that they fell on expiration, while the R waves rose on expiration and fell on inspiration with accleration of the pulse. Variations occurred due to excitement, etc. The short pulse of inspiration was due to stronger sympathetic innervation, and the longer pulse of expiration correspond to the vagus stimulation of the heart.

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is usually the result of a progressive atony of the bowel, with a gradual decrease of the natural mucus and other secretions. The loss of moisture dries the feces and interferes with their free and easy passage. Under such conditions

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The Utilization of the Complement Fixation Reaction in the Diagnosis of Tuberculous Meningitis.—Robert A. Kilduffe (*Journal of Laboratory and Clinical Medicine,* April, 1922) in the case which he reports in detail did a complement fixation test upon the spinal fluid and blood serum of the patient, reasoning on the following lines: if the reaction occurred in the spinal fluid, the antigen being biologically specific, the positive reaction would indicate the presence of specific antibodies without, however, indicating their possible source. If, however, the reaction was negative in the blood serum, knowing that the interchange of antibodies between the blood and spinal fluid occurred only in slight degree, then it seemed fair to conclude that the positive reaction in the spinal fluid arose from the presence of tuberculous infection in the meninges. A positive serum reaction would as greatly diminish the significance of a positive spinal fluid reaction as a negative serum reaction enhanced it. The tuberculous complement fixation test was positive in the spinal fluid in 1 c. c., and negative in the blood serum in 0.2 c. c. The case is reported as illustrative of a possible method of laboratory diagnosis in a condition often presenting a puzzling problem about which no mention is found in the current literature of the disease.

Fatal Hemoptysis.—A. Kristenson (*Upsala Läkareforening Förhallende,* August 5, 1922) reports in detail a case of pulmonary tuberculosis resulting in rupture of the pulmonary artery with fatal hemorrhage. The clinical diagnosis was as follows: pulmonary tuberculosis with hemoptysis; bronchiectasis; chronic bronchitis; arteriosclerosis; chronic nephritis.

The greatest interest both from a clinical and pathologico anatomical viewpoint was centred on the hemorrhage and the changes which brought it about. From the description of the microscopic material and the accompanying illustrations, it is easy to see that the rupture of the vascular wall was due to a tuberculous process of a rather acute type. The vessel wall had been approached from the outside, infiltrated with tuberculous granulation tissue and finally so weakened that it could no longer withstand the blood pressure and burst.

The blood streaming out found its way along the path of least resistance through the tuberculous and anthracotic tissues between the bloodvessels and the bronchi.

The resulting hematoma did not apparently last long and as the walls surrounding it gave no reaction, although no thrombus formation could be discovered, it passed rapidly on to the bronchial walls which, weakened by tuberculous processes, soon gave way. The hemorrhage into the bronchi must have been considerable as the blood had but a short distance to travel and through a wide passage at a pressure whose normal at this point stands at 50 mm. Hg. As a result the bronchus was so rapidly inundated with blood that the latter could not be expelled by coughing but was aspirated causing asphyxiation.

From twenty-four to seventy-nine per cent. of all cases of pulmonary tuberculosis result in hemorrhage. Out of 1,147 patients treated by the author in the tuberculosis ward of the Academic Hospital in Upsala, 540 (forty-seven per cent.) had had hemorrhage. Ten of these cases (one per cent. of all the tuberculosis cases and two per cent. of the hemoptysis cases) ended fatally, the patients choking to death from the hemorrhage. There are not infrequent cases of acute anemia following hemorrhage that go on to death in a few days. The cause of the fatal hemorrhages is in the majority of cases to be traced to an eroded vessel in a cavity with or without preliminary aneurysm. Only in exceptional cases does parenchymal hemorrhage assume such proportions. Of the ten cases of hemoptysis observed by the author, one showed a ruptured aneurysm into a cavity; in another an eroded vessel opened direct into a cavity with no sign of aneurysm; and in the eight other cases the exact point of perforation could not be found. Clinically and pathologically closely related to these hemorrhages are the intrabronchial hemorrhages due to the injurious effect of the lymph glands on the vessels in their passage through the pulmonary hilus. These often end fatally. As the cases of fatal hemoptysis in noncavernous lungs are quite rare, the author felt justified in presenting this one.

Studies on Experimental Diuresis. — K. O. Larsson (*Hygeia,* August 31, 1922) states that the object of these experiments was to gather some definite conclusion as to the intermediary currents in diuresis necessary for a better understanding of the pathosynthesis of the eclamptic symptom complex. He found that in many ways these currents were identical with those found in disturbances of the salt water metabolism of the organism. The decrease in chlorides and dilution of the blood are constant phenomena in both. The diuretics were administered intravenously to the rabbits. The first effect is a flow of tissue fluid into the blood stream. This is soon counterbalanced by the rapid fluid and chloride excretion in the extreme uresis. Thus the kidney action is dominating at first. But the kidneys soon show signs of fatigue, the blood has become considerably concentrated and thus a temporary pause in uresis is established. The flow of tissue fluid or salt and water into the blood stream continues with resulting hyperchloremia and dilution of the blood. The course of this current is therefore from the tissues to the blood out through the kidneys. It is of great importance to demonstrate that ions and cations have each their individual opposite courses in the bloodstream, and that therefore it cannot be sodiumchloride that is affected by the organic currents or excretion. This is the result of therapeutic doses of diuretics. Overdoses or toxic doses have the opposite effect and create anuria. These experiments were undertaken with the purin diuretics, caffein, teobromin, tofyllin and teocin. The author was also much interested in the effect of novasurol. Novasurol has an equal effect on sodium and chloride which is not the case with the purin diuretics. Novasurol may therefore be considered as having specific effect on sodiumchloride. This is of great importance to the author, as he may now, by careful choice of his diuretic, influence the ion current in his efforts to establish a synthesis of the eclamptic symptom complex. He prefaces his experimental reports with studies of the galvanic irritability of the nervous system as related to disturbances in salt metabolism as observed in eclampsia, nephritis, and uremia.

Influenza and Broncho-Pneumonia

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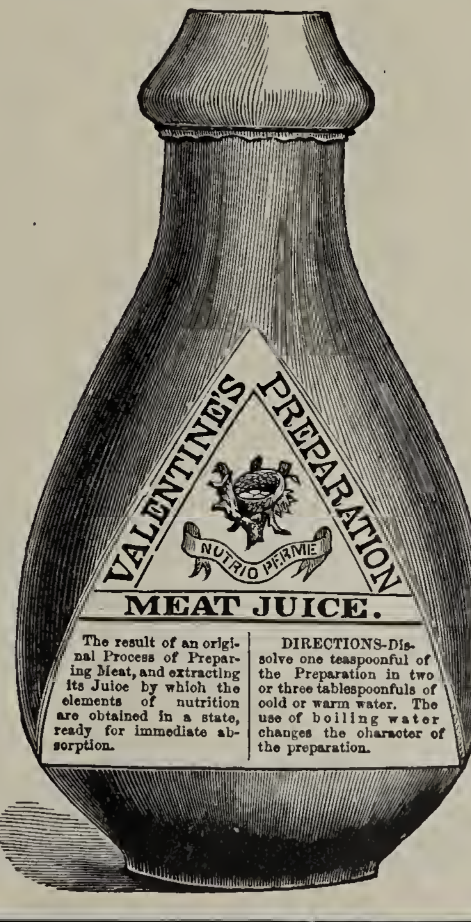

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Dr. R. Sarandeses, *Physician to the Provincial Hospital, Oviedo, Spain:* "I had occasion to use VALENTINE'S MEAT-JUICE on a member of my own family and with excellent results. It is most agreeable to the sick and well, is easily prepared and administered, and for the young anæmic constitutes a superior remedy."

Dr. Lenoble, *Surgeon in Chief, Military Ward of the Hospital D'Argentan, Argentan, France:* "The powerful reconstituent, VALENTINE'S MEAT-JUICE, brought about a great improvement in the condition of the sick and wounded, whose long stay in the trenches had made them particularly anæmic."

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Miscellany.

Acute Arsenical Poisoning.—William Henry Willcox (*British Medical Journal,* July 22, 1922) finds that in poisoning with the inorganic preparations of arsenic, the gastrointestinal symptoms are the most prominent and at necropsy the arsenic is found distributed through all the organs. In poisoning by arsphenamine and allied compounds (organic), the prominent features are the poisonous effects of the arsenicals upon the organs of the body which produce the fatal symptoms; the liver bears the brunt of the attack and suffers the most damage. In fatal acute cases, marked fatty degeneration of the liver occurs and the same type of changes are seen in the kidneys and heart muscle. The symptoms of acute arsphenamine poisoning exactly simulate those of icterus gravis and the author believes that they are due to autointoxication from defective liver function consequent upon the action of the poison on the liver cells. The damage and impairment of the function must be very extensive to produce fatal autointoxication, but it does occur and therefore the changes attending the use of arsphenamine administration should always be borne in mind. The poisoning may result not only from massive administration but also from repeated doses, as shown by the occurrence of jaundice from injury of the liver weeks or months after the administration of arsphenamine, with most serious results. To avoid such a mishap, the amount of glycogen in the liver may be increased by the administration of glucose shortly before the arsphenamine is given.

Later Effects of Gas Poisoning.—T. E. Sandall (*Lancet,* October 21, 1922) presents conclusions which, in some respects, do not agree with popular impressions. He believes that if complete recovery does not take place at an early date, the later effects of gas poisoning, if not permanent, are at any rate of very long duration and lower the standard of health of the individual indefinitely. In nearly half of the cases he found emphysema, chronic bronchitis, or both, but he does not believe that pulmonary tuberculosis is a frequent sequela. He says that a certain number of tuberculosis cases give a history of gas poisoning, and that gas poisoning may perhaps stimulate latent tuberculosis into activity, but he has not seen the disease develop as a proper sequela in a single case. In nearly half of the cases there is definite tachycardia, especially in those poisoned by phosgene, yet in the great majority of these, eighty-five per cent., nothing abnormal can be found in the heart, and the causation of this condition appears to him the most important problem in connection with the subject. The persistence of gastric symptoms also raises the question of organic or functional causation. In a certain number of cases neurasthenia develops, but it is not clear whether this is due to the gas poisoning, or to the shock of the nervous system at the time of the original casualty. Another interesting point is the pain in the chest of which complaint is frequently made; is this an evidence of myocardial involvement, or is it merely a functional manifestation? With reference to prognosis he raises the question whether the element of "pension" may not operate as a factor in the causation or continuance of symptoms.

Laryngofissure for Cancer of the Larynx.—After twenty-one years of experience with the operation of laryngofissure, St. Clair Thomson (*British Medical Journal,* July 22, 1922) firmly believes that, if cancer is limited to one vocal cord and is operated on very carefully, this operation is safe as regards its execution and certain in its results. The operative mortality should be nil, a serviceable voice can be promised, and there is every prospect of a permanent freedom from recurrence. The only prerequisite is an early diagnosis.

The Theory of Inflammation.—Proceeding from Weigert's theory on inflammation, that "bioplastic" energy is liberated by the loosening of the cell cement substance as a result of the loss of constituent elements of the tissues, Ferdinand Röder (*Wiener klinische Wochenschrift,* July 27, 1922) endeavors to determine the nature of this potential energy. As a result, he proposes the following definition: Inflammation is a circulatory disturbance, usually occurring in two stages, that of the acceleration of the current and that of its retardation; the latter may be divided into two characteristic stages, that of a diminished capillary pressure and that of an increased capillary pressure.

Dangers of Rapid Intravenous Injection of Quinine Solution.—U. N. Brahmachari (*Lancet,* July 22, 1922) observed that a dangerous fall in blood pressure may result during rapid intravenous injections of solutions of quinine; the severity of the reaction depends upon the amount of quinine passing through the heart every second. Some observers also assert that the intravenous injection of large quantities of saline solution, such as a pint, may be excessive for a weak heart and therefore the question of the dilution becomes important. After conducting a series of experiments, the author concludes that in giving intravenous injections of quinine bihydrochloride, the solution of the salt should not exceed the strength of 1:300; it should be injected at the rate of ten c. c. a minute in patients over fifteen years of age. In patients below that age, the rate should be half of the one mentioned above.

Therapeutic Use of Germanium Dioxide in Anemia.—Ludwig Kast, Hilda M. Croll, and Herbert W. Schmitz (*Journal of Laboratory and Clinical Medicine,* August, 1922) treated sixteen patients suffering from anemia, administering the germanium dioxide by mouth in 0.2 per cent. water solution. Doses of between one hundred and two hundred mg. of the oxide were given daily or every two or three days until about one gram had been given. An examination of the table accompanying this paper shows that the periodical rise and fall of the red cell count after germanium, as noted by Hammett and Müller, was also seen in this series of cases. The influence of germanium or hemoglobin production was usually somewhat less marked and more delayed than its influence on red cell formation. A study of chemical blood and urine analyses in seven cases revealed no apparent effect of the germanium on the functional activity of the kidneys. In view of the fact that the germanium was found to have distinct erythropoietic action in some of these cases, it would seem worth while for this method of treatment to be further studied in a larger series of cases.

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W. T. Watt, M. D., *Director Imperial Medical College, Tientsin, China:* "In cases of Infantile Diarrhœa, which weakens and debilitates a child rapidly, I have found VALENTINE'S MEAT-JUICE a great stimulant and quick restorative of vitality. Three years ago when an epidemic broke out in Tientsin, I ordered my staff to try your MEAT-JUICE, which justified all expectations, having been satisfactory to patients and physicians alike."

Dr. Calatraveno, *Late Physician of the Children's Hospital, Madrid, Spain:* "I have employed VALENTINE'S MEAT-JUICE most successfully in cases of convalescence from infectious diseases, and it is especially beneficial for children suffering from urinary weakness caused by extreme debility, as in every case it acted remarkably in restoring their strength with notable rapidity."

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Miscellany.

Blood Cholesterol, Its Importance, and the Value of Its Determination in Cancer Research.—Georgine Luden (*Canadian Medical Association Journal,* March, 1922) thus summarizes her paper: 1. Cholesterol is an important chemical constituent of the blood. 2. There is evidence that the blood cholesterol plays an important part by promoting cell proliferation and by combating bacterial invasion. 3. The test for cholesterol in the blood is not a diagnostic test, but it furnishes valuable information concerning the efficiency of cholesterol metabolism. 4. The activation of cholesterol metabolism after radium treatment demonstrated by the blood cholesterol determinations, and the parallel improvement of patients suffering from malignancy indicate that there is an intimate connection between disturbances of cholesterol metabolism and malignant disease. 5. Cholesterol metabolism can also be improved by dietary measures, suggesting that beneficial effects may be expected from dietary measures tending to reduce the cholesterol intake with the food, combined with radium therapy. 6. Since the life of the cells depends upon their blood supply, the chemical composition of the blood must be equally important; radium treatment changes the chemical composition of the blood, as is shown by blood cholesterol determinations. 7. Spontaneous cures have been observed in well-authenticated, inoperable, "hopeless" cases of cancer: this proves that the body can wage a winning fight against malignant disease; as therapeutic measures had proved ineffective in these cases, some internal readjustment must account for the cures. Chemical investigations will solve the cancer problem by revealing the nature of this readjustment.

The Technic of Pneumoperitoneum.—David Holmdahl (*Hygeia,* October 30, 1922) criticizes the methods used heretofore for producing pneumoperitoneum and describes a new method with distinct advantages over that of Goetz. By accidental perforation of the abdominal wall and diaphragm during three attempts at establishing pneumothorax, the author found an opportunity of studying the pressure conditions of the abdominal cavity. As a result of these observations, the author suggested the following technic for pneumoperitoneum. The patient is placed in the right lateral position with the chest somewhat elevated. The same apparatus is used as in pneumothorax. The needle is inserted from above the margin of the thorax into the left anterior axillary line pointing so far down that the eighth intercostal space is reached. When the needle has thus penetrated the diaphragm and entered the abdominal cavity, the manometer record is negative, providing the abdominal musculature is relaxed during the operation and the intestinal canal is not too full. In any case the opposite oscillation will register on deeper breathing when the needle enters the abdominal cavity. Thereupon the patient is allowed to breathe in air to the desired amount. By this method the development of emphysema of the abdominal wall may be avoided and the risk of puncturing the relatively thick, ventrical wall can be avoided by inserting the needle slowly, as one can tell by the manometer if the point has entered the abdominal cavity.

The advantages of this method are the following: 1. It does not record the negative pressure only, but also and particularly the inverted oscillation toward the pleural cavity, so that it may be ascertained with great accuracy just when the point of the needle has entered the abdominal cavity.

2. The patient need not be placed in the Trendelenburg position in order that the negative zone of the abdomen may be reached. This zone can also be reached with the patient in the lateral, horizontal position, or, better still, with the chest raised. The operation is easier when the patient is in a more natural position.

3. By inserting the needle through the diaphragm instead of through the abdominal wall certain advantages are gained. The operation is easier and safer. It is easier to judge how deep to penetrate. The abdominal musculature does not need to be punctured and must be kept relaxed throughout the operation.

The Diagnosis of Diseases of the Urinary Tract.—William C. Quimby (*Boston Medical and Surgical Journal, August* 17, 1922) suggests the following as working rules in our present state of knowledge concerning diagnosis of diseases of the urinary tract: 1. Do not rush to the use of such modern diagnostic aids as the cystoscope before having taken a detailed history of the patient and having made a thorough general physical examination. 2. Examine the urine, especially for microscopic amounts of pus or blood, but do not feel that if the urine is normal this fact excludes the possibility of disease in the urinary tract. 3. Look with the eye of a skeptic on all shadows in the plain x ray plate which seem to mean lithiasis within the urinary passages until such shadows have been proven by further measures to be in fact within these passages. 4. The accurate and early determination of the exact source of pus or blood in the urine is imperative. This can only be satisfactorily accomplished by the use of the cystoscopic and urethral catheter. 5. The data to be learned by the pyelogram are frequently of the greatest importance.

Air Embolism Following Various Diagnostic or Therapeutic Procedures in Diseases of the Pleura and the Lung.—Karl Schlaepfer (*Bulletin of the Johns Hopkins Hospital,* September, 1922) quotes a number of instances from the literature in which following various diagnostic and therapeutic procedures on the chest (puncture, irrigation of a cavity, changing tubes, introducing a probe or a rubber catheter, bismuth paste filling, decortication, thoracoscopy, fat or paraffin plombage, pneumotomy, pneumectomy) complications may ensue. These have been proved experimentally and clinically to be caused by air emboli. The clinical picture of these air emboli varies greatly, and should be made more exact by further study of the complications by means of ophthalmascopic, stool and urine examinations. The author says that the best therapy is the preventive one. When an air embolus occurs, he advises stopping the operation immediately, lowering the head of the patient, and reinforcing the heart action with stimulants. Intravenous injections of adrenalin will increase the amount of blood passing through the brain by diminishing the blood supply in the splanchnic areas (intestines, skin).

Constipation in Young Girls and Women—

especially those who spend much time indoors engaged in sedentary pursuits—is almost invariably attended by a retention of waste and toxic substances. Sooner or later these make their way from the bowel into the general system and give rise to a host of autotoxic ills.

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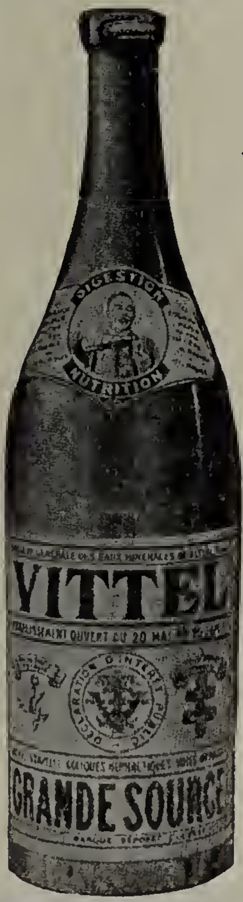

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Experimental Production of Periarteritis Nodosa in the Rabbit with a Consideration of the Specific Causal Excitant.—William H. Harris and Andrew V. Friedrichs (*Journal of Experimental Medicine,* August, 1922) produced lesions in rabbits identical with those of periarteritis nodosa by the injection into the ear veins of an emulsion of nodules from a human fatal case of the disease. The lesions consisted of exudative and degenerative processes within the walls of the smaller arteries resulting in aneurysmal formations and thromboses. They were also able to produce the lesions in rabbits injected with a filtrate obtained from an animal previously injected with the emulsion of the human nodules. They conclude that periarteritis nodosa is a specific infectious disease which is transmissible to rabbits, and that the microorganism inducing the disease belongs to the class of socalled filter passers, as it was capable of going through a Berkefeld filter N.

Dislocation of Shoulder.—T. W. Todd (*Annals of Surgery,* July, 1922) summarizes as follows: Posterior congenital dislocation of the humerus, as illustrated in the Hamann Museum at Western Reserve University, provides the following information: 1. It is of the subacromial type and differs from pathological dislocation in the fact that the humeral head never leaves the glenoid surface. 2. It results from a maldevelopment confined to the scapula and not affecting the humeral head. The maldevelopment is in the dorsal part of the scapular neck, so that the glenoid surface is rotated on to the dorsum of the blade. Accompanying this is a drooping of the acromion over the shoulder. 3. Congenital dislocation is a high grade of the deformity just described, which, however, may be of slight development and unilateral or bilateral. 4. The condition was found in three white males only among a random sequence of 730 complete human skeletons distributed as follows: 489 white males, sixty-six white females, 143 negro males, thirty-two negro females. 5. In the collection just mentioned there is no case of congenital dislocation of femur or radius. 6. Posterior congenital dislocation of the shoulder is not a true dislocation since the humeral head never leaves the glenoid surface. It is undoubtedly posterior and all the evidence goes to show that it is really congenital in occurrence since it makes its appearance coincidently with the original scleroblastic formation of the scapula. 7. There is no inherent reason why this postural deformity should not be associated sooner or later with a nerve lesion.

Persistence of Tubercle Bacilli in Expectorated Sputum.—G. Lemière (*Journal des sciences médicales de Lille,* June 4, 1922) calls attention to the fact that when tuberculosis sputum is collected in sterile test tubes, which are then stoppered with cotton, the subsequent course of events as regards the tubercle bacilli is far different from that obtaining when the sputum is discharged in unsterile receptacles and left exposed to the air. In the latter case, the tubercle bacilli are soon overwhelmed owing to the development of putrefactive germs, but in the former, putrefaction seldom occurs. The contents gradually divide into a lower solid and a supernatant fluid layer, but after ten days no further change takes place, and in the sediment tubercle bacilli are plainly to be seen even without centrifugation. These bacilli were found to remain intact in such preparations for at least fourteen months. In collecting sputum for examination, therefore, it is a good plan to use sterile test tubes to be stoppered with cotton. Further, tubercle bacilli are shown by these observations to be a potential source of danger even months after emission of the sputum.

The Morphine Habit and Its Treatment.—Margaret Vivian (*Medical Press and Circular,* November 29, 1922) says that, given a patient who is anxious to be cured, who has the average will power, and who is able to enter a medical home for a few weeks, the ideal treatment is as follows: During the first week the daily dose is rapidly cut down to two grains. It does not matter what amount he has been in the habit of taking or for how long; two grains a day will keep him comfortable and enable him to lead a normal life. When he has become accustomed to the two grains and feels no desire for more, he will begin to feel better in health, and he will eat and sleep better than he has done for years. This fact alone will encourage him to persevere. Then the daily dose is reduced by one quarter grain. The first day he may feel a little tired, but this amount is maintained until he feels that it is ample for his physical needs and he wonders why he ever took more. The procedure is repeated until a daily dose of one grain has been reached without discomfort, and it will be wise to remain at this stage for several weeks. At first one quarter grain is given four times a day, then one half grain twice a day, and finally one grain once a day, preferably on rising in the morning. The early morning is always the time when a morphine patient is at his worst, and it is advisable to continue the morning one grain dose for weeks or even months until the patient has lost all desire for the drug at any other time. From this time onward the progressive reduction must be slowly carried out. Undue haste merely leads to disappointment, and may necessitate going back temporarily to a larger dose. Even if it takes twelve months to get rid of the last grain by monthly reductions of a twelfth of a grain that is after all not an unreasonable time in which to cure a longstanding and difficult case. The patient has the mental relief of being supplied by his doctor with the necessary drug, so that there is no longer any need for him to obtain it by backdoor and expensive methods. He also has the satisfaction of cooperating in his own cure, and it is often necessary to impress on him the need to make haste slowly, so keen does he become in accelerating the pace. His health and spirits improve rapidly, and his nervous system is spared the terrible strain of the usual short cut treatment which in so many cases ends in absolute failure.

Treatment of Hay Fever.—W. C. Williams (*Military Surgeon,* October, 1921) concludes that the cutaneous test for hypersensitiveness to pollens is a simple, safe procedure and is invaluable in determining the particular pollens to which an individual may be sensitive. The treatment of hay fever by desensitizing injections of extracts of specific pollens requires accuracy and caution, and, although not always successful, it apparently offers the most rational and effective means of treating this condition.

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Pneumonia *and* Influenza.

William H. Peters, M. D., *Admitting Physician, Camp for Consumptives, State of Rhode Island, Providence, R. I.:* "VALENTINE'S MEAT-JUICE was the only nourishment retained by my five-year old daughter during an attack of Pneumonia. I consider that it saved her life and believe it to be the best product of its kind."

Cavalier Dr. Enrico Ballerini, *Late Surgeon to the Hospital of Rome, Italy:* "I have used VALENTINE'S MEAT-JUICE in the treatment of patients, and also personally, after having been very ill with Influenza, and I must say it is an excellent tonic in conditions of great organic weakness. It is also very agreeable. I have prescribed it with the greatest satisfaction for convalescents and invalids restricted to a liquid diet."

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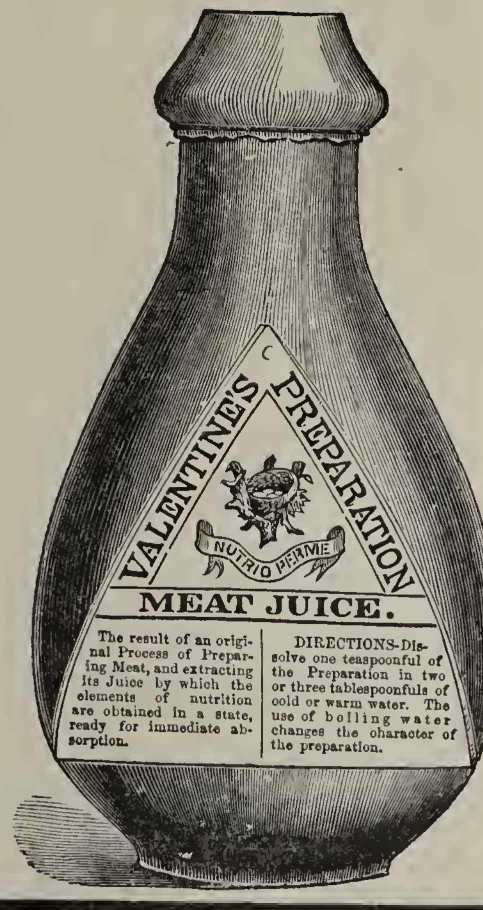

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Miscellany.

Visceral Crises.—Arthur Mills (*British Medical Journal,* July 1, 1922) asserts that visceral crises are a manifestation of inherited and late syphilis and that they are not peculiar to tabes. No widespread syphilitic involvement of the nervous system should be attributed to tabes unless the posterior nerve roots are found involved, this alone forming the classical symptom of tabes. Visceral crises should not necessarily be included among the posterior root irritative phenomena, but should be considered as evidence of the morbid process being probably present elsewhere.

Of all the classical symptoms of tabes, root pains are probably the most constant. They are attributed to various causes, but the newer advances in the pathology of late syphilis will probably show that the crises are due to a syphilitic infection of the autonomic nervous system: the essential tissue lesion of either late or latent syphilis is a mild irritative or inflammatory process occurring in any tissue or organ, caused by the localization in the tissue of relatively avirulent spirochetes. The author reports three cases of recurrent attacks of abdominal pain and vomiting with positive Wassermann reactions, all of which respond to the therapeutic test. The classical symptoms of tabes could not be elicited.

Visceral crises are relatively uncommon in tabes (ten per cent.) but syphilitic visceral crises may be relatively frequent and may be responsible for many vague conditions, diagnostic errors and fruitless laparotomies in such cases as are diagnosed as colic, appendicular colic, kinks, bands and adhesions, and cholelithiasis without gallstones. The investigation of the knee jerks will not help, but the Wassermann test may help in clearing up the diagnosis.

The Reticuloendothelial Cells.—R. Hermann Jaffé (*Wiener klinische Wochenschrift,* July 6, 1922) states that the body contains a widely distributed cell system, which is characterized by a marked affinity for storing carmine; they also absorb colloidal substances (silver, gold, platinum, bismuth, etc.) circulating in the blood and they show marked phagocytosis, representing the fixed macrophages of Metchnikoff and playing an important part in the metabolism of hemoglobin, iron and fats. In some infections they are concerned almost exclusively with the reactive tissue changes. The reticuloendothelial system includes the following groups of cells: the connective tissue cells of Renant, the adventitious cells of the sinuses, the reticulum and pulp cells (splenocytes) of the spleen, the reticulated and endothelial cells of the lymph nodes and bone marrow, the capillary endothelia of the suprarenal glands, the spindle shaped or branched cells around the small bloodvessels, the clasmatocytes of Ranvier, the rhagiocrine connective tissue cells of Renaut, the adventitia cells of Marchand, the resting wandering cells of Maximow and the pyrrhol cells of Goldman; Lubarsch also includes the intraacinar reticulum of the pancreas and the reticulum of the thymus; in adults, the glious and the iron carrying mesenchymatous cells in certain portions of the brain may be included. These cells may separate from their cell connections and appear as free, wandering cells in the tissues and blood, forming a third group of the white blood cells, called histiocytes (Aschoff), which are easily distinguishable from the other white blood cells: after repeated injections of carmine, they show red granules in the protoplasm and resemble the large mononuclear and transition forms. They are functionally insignificant under normal conditions, but they become functionally prominent in certain diseases, such as those with increased destruction of blood (severe anemias), deep röntgen irradiation, those involving the metabolism of fat and lipoids (cholesterin), Gaucher's splenomegaly, typhoid fever, chronic infections (tuberculous, leprous and scleromatous granulations) and tropical parasitic diseases.

Observations on Catgut.—J. Fürle (*Archiv für klinische Chirurgie,* Band 119, Heft 2, 1922) states that catgut is prepared from the small intestine of goats and sheep. In the process of preparation the submucosa is the part of the intestinal wall that is used. Absolute sterility of the catgut is impossible with the methods of preparation used by the manufacturers. Of the various methods of preparation, the cumol method (Krönig), the formalin and boiling method (Hofmeister) and the iodized catgut (Claudius, Kuhn) are the best. The tensile strength is best determined by the clinical surgical utility. Resorption begins at the earliest in two to three days, but chromicized catgut has been found in the tissue after a year and a half. Infection of the tissues by catgut is the result of insufficient sterilization of the catgut, infection of the catgut by the hands of the surgeon and by the imbibition of the suture of wound germs. The biological bacteriological testing of the sterility of the catgut is difficult because of its impregnation with antiseptics. The final handling of the suture under the supervision of the surgeon responsible is very important. The prepared ligature is best preserved dry (Mikulicz, Esmarch). The very recently vaunted vacuum sterilized catgut has no advantages over the other prepared catguts.

Infection of the Sigmoid and Lateral Sinus.—H. I. Lillie (*Surgery, Gynecology, and Obstetrics,* October, 1922), from a series of nineteen cases, concludes that patients should be treated individually rather than by one routine surgical procedure. Primary operation on the jugular vein is not definitely indicated unless bleeding does not occur from the lower end of the sinus. The operation on the vein may be safely delayed, if both ends of the sinus bleed freely and the patient seems to be in fairly good condition. In none of the cases was the vein resected. Too much dependence must not be placed on laboratory findings. The general appearance of the patient is a fairly reliable index of the condition. Blood transfusion by the citrate method, care being taken properly to group the patient, is a valuable supportive measure. Unnecessary handling and examination should not be done as it annoys the patients. Forced feeding, quiet pleasant surroundings, and cheerful nursing are important factors. Patients with lung complications may recover. Thrombosis of the straight sinus may cause symptoms and signs of brain abscess. The prognosis may be said to be fairly good if well directed measures and timely surgical interference are employed.

Influenza and Broncho-Pneumonia

The most disagreeable feature of these affections as they are occurring in the current epidemic, is the extreme and often dangerous depression that all too often accompanies even the mildest attack. These ills, however, have lost many of their former terrors to physicians who have learned to depend throughout their course on the tonic and supportive action of

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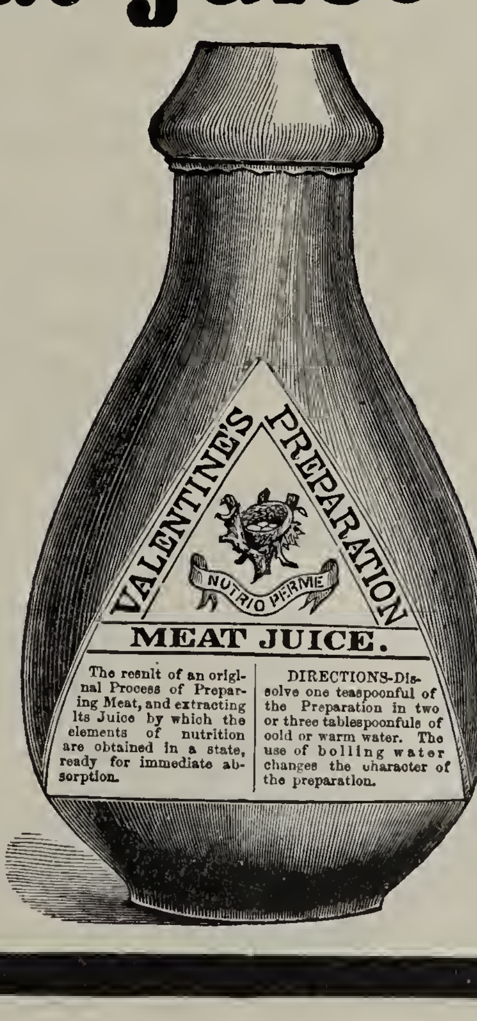
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Miscellany.

Blood Destruction During Exercise.—G. O. Broun (*Journal of Experimental Medicine*, November, 1922) undertook the experiments reported on dogs with the object of determining whether an increased rate of blood destruction during exercise could be demonstrated. For purposes of exercise treadmills were used, constructed so that the tread was at an angle of 20°. The standard day's exercise consisted of two periods, each of two hours, separated by one hour's rest. The author found an increase in the percentage of cells and hemoglobin in the blood of the jugular vein early in the course of exercise. He interprets this as a probable result of a redistribution of red corpuscles, with an increase in their proportion in the peripheral blood. A definite increase in plasma volume was noted as exercise was continued. A coincident decrease both in the total cell volume and the pigment volume during prolonged exercise suggests that blood destruction then occurs.

Effects of Compression of the Adrenals and Blood Transfusion.—Gautrelet (*Presse médicale*, March 7, 1923) found that when pressure is made on the adrenal products of its secretion appear in the circulation and induce characteristic physiological effects. In the dog there is noted either a rise of blood pressure or the increased amplitude of beat typical of adrenalin, according as atropine has or has not been previously administered. Hyperglycemia also results. If a blood transfusion into another animal is carried out during the experiment, the second animal shows the same adrenalin effects. The same effects are even produced if a third dog is used. Upon making pressure on the adrenal in a previously bled dog, the blood pressure is no longer raised, but the increased amplitude of beats is still produced in a transfused animal. The conclusion reached is that the cardiovascular effects in these experiments are due to the adrenal secretion. The product secreted by the adrenals is not destroyed in passing into the arterial or venous systems. A physiological adrenalinemia is therefore possible.

Bronchopulmonary Lithiasis.—J. Curtis Lyter (*The Medical Clinics of North America*, July, 1922) says that the true syndrome of bronchopulmonary lithiasis results from the extrusion of a calcareous mass, formed in the bronchial or pulmonary tissues by the calcification of bronchopulmonary tissue or lymph glands, into a bronchus and out toward the exterior. The most frequent and, probably, only cause of such calcifications is chronic tuberculous infection in individuals with marked tendencies toward cicatrization and calcification. The two prime requisites for this condition are the necrosis of infected tissues and the deposition of calcium salts. Calcification also occurs in other pulmonary conditions, such as infarcts or abscess formation. Another requisite for the expulsion of stone is rupture of the surrounding fibrous capsule. The symptomatology may be *nil* because of the intactness of the enclosing capsule or the relative small size of the adjacent bronchus, or if the stone is very distant from the bronchus. The symptoms of migration or expulsion of a concretion are a slight paroxysmal cough, with slight or moderate constriction. The stone may be passed unnoticed in the sputum or it may be recognized by the patient. Severe cases show a sudden onset with pronounced thoracic oppression, poststernal pain, distress, constriction, dyspnea and a sense of anguish or tearing in the poststernal or lateral region of the chest, followed by a paroxysmal cough until the stone is either expectorated or redescends into the lower airpassages. The physical signs, which up to this time showed either a chronic disease or no evidence at all, now show evidence of pulmonary infection and infiltration and the patient is usually considered to be tuberculous. The complications usually are bronchitis, pleuropneumonia, pulmonary abscess, pyopneumothorax and sudden death from obstruction of a large bronchus. The author reported two cases wit hthe complications of pulmonary consolidation followed by pleural effusion.

Late Reaction Following Röntgen Irradiation.—Fritz M. Meyer (*Zentralblatt für Gynäkologie*, August 12, 1922) applies the term late reaction to a pathological change in the skin, which appears on the irradiated area of skin at least several months after the röntgenotherapy, without showing a radiodermatitis either during, or more or less after the irradiation. The author reports such a finding in a woman who was irradiated for a fibromyoma uteri. The skin on the abdomen was discolored brownish red throughout and showed numerous nodular elevations of the most varying size and form and also many cicatricial retractions. On the whole, the skin felt as hard as a board and showed a consistency like that of scleroderma: the skin could not be picked up in folds between the fingers. This was noticed as the earliest about seven months after the röntgenotherapy, without any dermatitis having occurred during or immediately after the treatment.

Two Cases of Bilateral Gynecomastia.—M. J. Bariliari and A. Gambetta (*La Prensa Medica Argentina*, January 10, 1922) report these cases, one in a man of seventy-six years with physiological enlargement of both mammary glands without pain or signs of inflammation, first noticed at the age of eighteen. On handling a feminine lobulation was distinctly perceptible. Sexual potency had ceased more than twenty years earlier and his external genitals seemed somewhat atrophied. Tapering feet and fingers, absence of body hair, pigmentations, a voice he said had always been shrill, and other stigmata justified a diagnosis of dysendocrinism on the part of the thyroid, pituitary, and adrenal glands, and of the testicles. The other patient also exhibited various endocrine symptoms.

Oil Ether Colonic Anesthesia by the Control Method.—Alfred E Boyd (*Irish Journal of Medical Science*, December, 1922) asserts that ether in olive oil administered by the colon produces an anesthesia characterized by an even, placid respiration of normal range, with absence of venous and capillary congestion and of mucous secretion in the throat. Danger can be avoided almost entirely by the use of the control method in which the strength of ether in the standard solution is fifty per cent., anesthesia being completed and controlled by a limited amount of oral inhalation. The success of the method depends on a strict adherence to technic.

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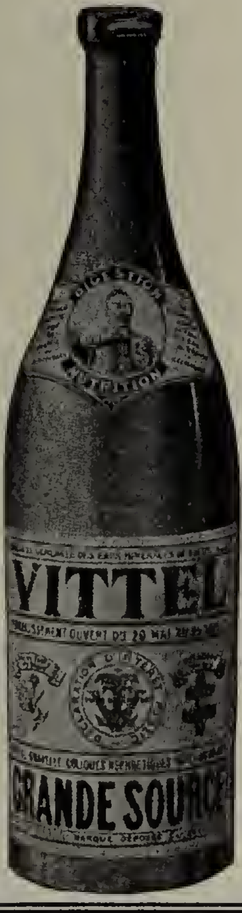

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Packing of the Nose after Operations.—Réthi (*Wiener klinische Wochenschrift,* July 20, 1922) always packs the nasal cavity after operations. He advises against the introduction of a narrow strip of gauze deeply into the nose and then packing the nasal cavity until it is filled, as this frequently does not stop the hemorrhage and may cause gagging. The main endeavor should be to compress the site of the operation by powerful lateral pressure. This the author accomplishes with the application of four to five ply strips of dermatol gauze five cm. long, which are introduced one over the other with a stout probe in several layers until sufficient lateral pressure is produced to stop the hemorrhage. When the hemorrhage has ceased, the shortest and outermost strip is removed first, followed by the successive strips nearer the wound, the last strip being removed after three to five days. The removal is painless and does not produce secondary hemorrhage.

The Postoperative Infusion of Sodium Chloride Solution Into the Peritoneal Cavity. — Albert Sippel (*Zentralblatt für Gynäkologie,* September 16, 1922) states that the routine infusion of three quarters to one litre of a warm (40° C.) physiological sodium chloride solution in connection with every laparotomy has a favorable influence upon the peritoneum. The associated advantages are: an elevation of the blood pressure, the stimulation of diuresis, the lessening of postoperative thirst and a favorable effect upon intestinal peristalsis; the disturbances resulting from the formation of adhesions and the associated postoperative intestinal obstruction resulting therefrom occur less frequently.

Epitheliomas.—F. M. Johnson (*Annals of Surgery,* March, 1922) concludes that adenoid cystic epitheliomas of the salivary gland type, occurring in the tissues of the mouth and face, are not as uncommon as the literature would indicate. Such neoplasms have been reported, but not properly recognized, and histologically interpreted. The tendency is to regard them as sarcomas. To this fact may be attributed some startling surgical cures. The characteristic tumor has slight malignant properties. Therefore it does not ulcerate and invade in its early stage. Radium treatment has been entirely successful in these cases.

Experiences in Plexus Anesthesia.—E. Platou (*Norsk Magazin for Laegevidenskaben,* September, 1922) enumerates some of the serious effects of plexus anesthesia, as reported by other authorities, and then proceeds to state the result of the method in thirty-three cases from his own observation in which twenty-six injections were performed according to the Kulenkampff method, out of which twenty-five were successful, and seven injections were performed according to Mulley's method out of which only three were successful. The technic of the Kulenkampff method consists in palpation of the subclavicular artery, insertion of a fine needle about five cm. in length immediately outside of the point where the artery bends down under the clavicle in the direction of the spinous process of the third dorsal vertebra. The author has achieved brilliant results with this technic, and feels that when carefully performed it is without danger. In many cases it is the only alternative to long continued narcosis.

Is It Worth While to Remove Aural Polypi?—J. S. Fraser and Stephen Young (*British Medical Journal,* September 9, 1922) believe that it is advisable to remove aural polypi through the external auditory meatus in the first instance in a case of chronic middle ear suppuration with aural polypi under the following conditions: 1, if there are no acute symptoms, such as earache, headache, mastoid tenderness, giddiness, vomiting, shivering, etc.; 2, if the labyrinth is found to be healthy on functional examination; 3, if it is possible for the patient to have efficient conservative treatment. If the growth occurs after efficient removal followed by careful aftertreatment, the radical mastoid operation is indicated.

Inguinal Hernia—Labat and Meeker (*Surgery, Gynecology, and Obstetrics,* March, 1922) gave a new method of field block in regional anesthesia in inguinal hernia. They conclude that regional anesthesia with novocaine adrenalin solution is the method of choice in inguinal herniotomy and should be used generally instead of only for patients who are unsafe subjects for general anesthesia. For inguinoscrotal or bilateral herniotomy in very obese patients, spinal novocainization is easier, quicker, and as safe as regional field block. A hypodermic of morphine and scopolamine one hour before anesthesia is induced is of aid in calming nervous apprehension. The patient should be informed beforehand of the method and its advantages. It is necessary that the surgeon's technic should be gentle and unhurried. Every possible detail contributing to the comfort of the patient should be utilized.

Hepatic Hormones and Essential Epidemic Hemeralopia.—J. de J. Gonzales (*Anales de la Sociedad Mexicana de Oftalmologia,* January, 1920-June, 1921) gives an account of two epidemics of essential vernal hemeralopia among the children in an asylum. The author relates the good results obtained by feeding fresh sheep and ox liver when other treatment had failed. He infers the existence of an endocrine function in the liver, engendering a hormone, which he characterizes as retinoexcitant, and which possesses the property of stimulating the production of the retinal purple, whose part in the adaptation of weak luminous intensities is well known. On this ground the hemeralopia must have been the result of a temporary hypofunctioning of the liver.

Bone Suppuration the Basic Cause of Renal Calculus in Twenty Cases Following War Wounds.—H. Ernest Paul (*Canadian Medical Association Journal,* September, 1922) finds in the twenty cases he reports evidence of a definite etiological relationship between the bone suppuration and the formation of renal calculi. He feels confident that infection is a definite contributing cause, if not the most important cause, and suggests that if every case of nephrolithiasis could be investigated with sufficient thoroughness, a history of a preceding systemic infection could be elicited. Such being the case the removal of calculus from the upper urinary tract should be considered only an important preliminary step in the cure, and treatment of the concurrent infection should be carried out thoroughly if recurrence is to be avoided.

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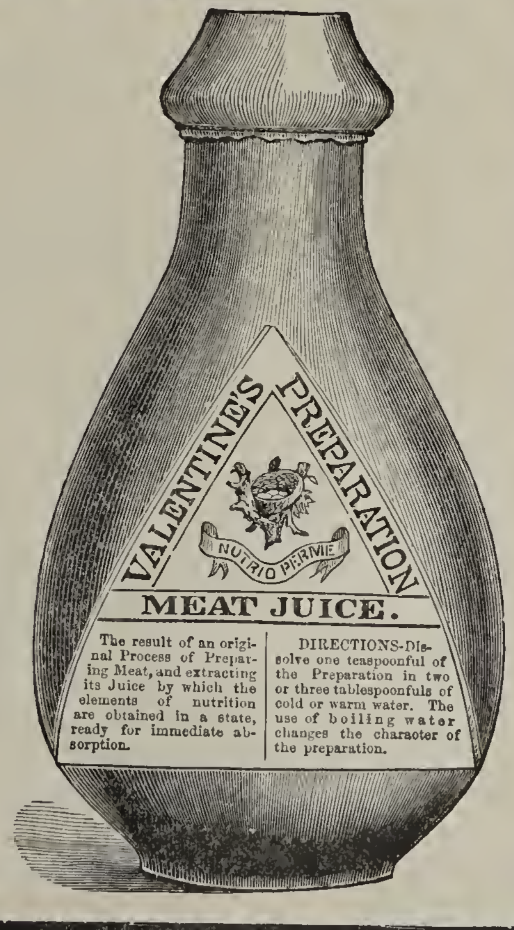
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Miscellany.

Posttraumatic Calcification of the Pancreas with Diabetes.—H. G. Wells (*American Journal of the Medical Sciences,* October, 1922) reports the case of a previously healthy young man who fell from a wagon and was probably run over by at least one of the wheels. He received fractures of several ribs on the left side, traumatic infarction of the left adrenal, the upper pole of the spleen and the entire left kidney, together with a crushing injury of the pancreas, which resulted in almost complete destruction of the secreting elements, which were replaced by a large quantity of dense fibrous tissue and extensive deposits of calcium salts. Analysis showed that about sixty-four per cent. of the dry weight of the pancreas consisted of inorganic salts, chiefly calcium carbonate. Jacksonian epilepsy developed, the result of necrosis of a considerable area of the cerebral cortex, presumably occurring at the same time as the other injuries. The patient became rapidly emaciated, exhibited great thirst and the urine found in the bladder at autopsy contained sugar. A review of the literature has failed to reveal a similar case of extensive pancreatic calcification, whether posttraumatic or otherwise, or an analogous case of diabetes following crushing injury of the pancreas.

Treatment of Acute Pneumonia and Influenzal Bronchopneumonia.—W. H. Wynn (*Lancet,* September 2, 1922) believes that vaccine treatment promptly and decisively aborts pneumonia and influential bronchopneumonia and lowers the mortality if given within twenty-four to forty-eight hours. The general treatment is the same as that usually given. The vaccine is made from primary cultures or the first subcultures, not detoxicated or sensitized. In acute pneumonia, the author administers a vaccine containing several strains of the pneumococcus and in influenzal bronchopneumonia he gives equal numbers of pneumococci, streptococci and influenza bacilli. In pneumonia he gives one hundred million pneumococci to adults and in influenzal bronchopneumonia he gives one hundred millions of each organism. To a child twelve to fourteen years old, forty to fifty millions of organisms are given, and to a child two or three years old, ten to twenty millions are given. With these doses the temperature falls to normal on the following day and no further treatment is necessary. The longer the treatment is delayed, the more often must the dose be repeated every twenty-four hours until the temperature falls. After the fourth day the vaccine treatment is useless. A negative phase need not be feared in pneumonia. Antipneumococcus serum is effective, up to the present time, only in the type I cases. As large amounts of serum must be given and as these are given intravenously, general constitutional reactions often follow. To avoid these reactions, an intradermal skin test should be made before administering the serum intravenously. Foreign protein material has given good results, but the thermal reactions are too severe to justify their use when the same result is obtainable without these disadvantages. Otherwise, the usual symptomatic treatment is followed. The author does not believe in the use of alcohol because its chief action is to depress the nervous system and to inhibit the formation of antibodies.

The Effect of Body Tissues Other Than the Thyroid Upon the Basal Metabolic Rate.—J. C. Aub and M. Taylor (*Endocrinology,* March, 1922) state that three methods of testing this question suggested themselves—extirpation of various organs, feeding of dried organs or of their active principles, and injection of active principles or organ extracts. Collating the literature respecting the pituitary gland, they found that removal of the anterior lobe caused a mild reduction in the basal metabolic rate which did not develop for weeks, that feeding experiments showed no effect, and that injection of the glands had a marked influence on metabolic rate. Removal of the gonads causes in animals a rather slow fall of metabolism, amounting to about fifteen per cent. three weeks after castration. This may be due to some interrelation with the thyroid. The evidence indicates that the spleen does not markedly influence metabolism. Even severe anemia does not much affect the basal metabolic rate, but may raise it slightly. Leucemia, on the other hand, causes a very sharp increase in metabolism. Regarding the pancreas deductions from experiment are somewhat contradictory. The conclusion is not warranted that the pancreas normally acts as a depressor of the metabolic rate. In mild cases of diabetes the rate is normal; in severe cases a high protein metabolism first occurs, followed by lowering of the rate from undernutrition and emaciation. In man the liver is not a regulator of the metabolic rate. No evidence exists of thymic action upon respiratory metabolism. No definite facts have been established respecting the parathyroids. It seems clear that adrenalin and thyroxin exercise mutually independent influences in increasing the metabolic rate, adrenalin acting quickly and for minutes only, thyroxin being sluggish in onset but effective for days. Various data lead to the theory that the metabolism may be normally regulated by two mechanisms—by the adrenals for rapid variations in rate, and by the thyroid gland for more sluggish but more important changes.

Diagnosis of Early Breast Tumors.—Joseph Colt Bloodgood (*Boston Medical and Surgical Journal,* August 17, 1922) emphasizes among others the following points: 1. The examination should be made without any knowledge of the history or of the breast involved. 2. At the examination palpation is the essential feature, first, to differentiate the indefinite from the definite single lump; second, having found a definite lump to try in every way to recognize any palpable sign of malignancy. 3. At the exploratory incision the gross appearance of the growth should be observed. Unless the surgeon has sufficient experience to be certain of the benignancy from the gross appearance and frozen section, the complete operation for cancer should be performed. 4. Recurrence in the region of the scar is due to late intervention or bad surgery, usually the former. 5. To improve results there must be earlier intervention of good surgery, but good surgery will be of little avail without publicity. 6. The mistake that should never be made is an incomplete operation for cancer, it must never be in two stages. 7. The mistake that cannot always be avoided is the complete operation for cancer in doubtful cases. Bloodgood believes that when surgeons become as good diagnosticians as they are operators the number of mistakes will be reduced.

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Consideration of Cancer.—J. C. Shaw (*International Journal of Surgery,* February, 1922) concludes that cancer is a disease of adult, or past middle life, and affects both men and women, white and black, rich and poor, and is most prevalent in the temperate zones. It is not considered hereditary, neither is it considered contagious nor infectious. In the beginning it is a local disease, but as it progresses, the toxic or poisonous materials are absorbed, and the general constitution is affected, as is shown by the loss of appetite, coated tongue, and a general cachexia. The etiology is not known, but the exciting cause seems to be some kind of irritation, either chemical or mechanical, which starts a new growth of epithelial cells. The conditions which predispose to cancer are age, injury or trauma, constant irritation from any cause, and any such growths as pigmented moles, warty growths, ulcers, erosions, fissures, lacerations, bruises, as of the breast, etc. The treatment is: 1. Prevention, by removal of all growths, as moles, warts or tumors which predispose to malignancy; the repair of all lacerations, as of the cervix; treatment of all fissures, chronic ulcers, etc., which are prone to become cancer. 2. Complete radical extirpation at the earliest date possible. 3. The persistent use of the x ray and radium in all cases suitable, and especially after radical extirpation. 4. All malignant cases should have good general care in every way, and in the terminal stages of inoperable cases, or operated cases with recurrence, sufficient doses of morphine should be given to relieve pain, induce sleep, and to make the patient as comfortable as possible until the end comes, as is inevitable.

Value of the Complement Fixation Test in Pulmonary Tuberculosis.—A. Lisle Punch and A. Hope Gosse (*British Medical Journal,* July 15, 1922) have previously shown that the complement fixation test is positive in ninety-eight per cent. of cases when the tubercle bacilli are present in the sputum. More recently they have shown that the two per cent. of cases in which the test is negative are those with a sudden onset and a rapid course, probably owing to the facts that the bacilli are very virulent and the invasion is massive, so that the cells which are responsible for the substances which produce the complement fixation are overwhelmed by the infection and cannot, therefore, properly respond. The rare cases, in which clinical symptoms of tuberculosis are present but the complement fixation test is negative at first but becomes positive later, are those in which a sufficient interval has not elapsed between the time of the infection and that of the elaboration of complement fixation substances. A series of control cases, consisting of healthy persons or those afflicted with nontuberculous diseases, showed negative complement fixation tests in 98.5 per cent. of cases. Of fifty cases presenting symptoms strongly suggestive of pulmonary tuberculosis but a negative complement fixation test, forty-nine showed no signs of tuberculous infection ten to twenty months later. The complement fixation test is positive before the tubercle bacilli can be demonstrated in the sputum. Owing to the uncertainty of the date of the infection, the exact interval between the invasion of the lung and the appearance of a positive complement fixation test is indeterminable. As the onset of pulmonary tuberculosis is gradual, the blood reacts positively by the time that the symptoms appear. If the onset is sudden and the test results negatively, the test should be repeated every two or three months before the diagnosis of tuberculosis is excluded. A positive test with positive pulmonary symptoms is an indication of active pulmonary tuberculosis. The test remains positive no longer than twelve months. Complementary fixation is very valuable when considered in conjunction with the clinical symptoms and it is an infallible guide to the presence or absence of active tuberculosis.

Creatine Formation in a Case of Progressive Pseudohypertrophic Muscular Dystrophy.—R. B. Gibson and Frances T. Martin (*Journal of Biological Chemistry,* December, 1921), from a study of an advanced case of progressive pseudohypertrophic muscular dystrophy draw the following conclusions from their experimental data: Ingested creatine was promptly and completely eliminated chiefly as creatine, in part as creatinine. The creatine and to a lesser extent the creatinine excretion was increased as the result of a greater protein intake. This increase is obtained only from the protein that is catabolized, including gelatin, and not from that retained for growth purposes. Preformed creatine in the diet was not an important factor to be considered in interpreting the results. Hordein, ingested sarcosine and asparagine did not lead to an increase in the creatine excretion, nor did the substitution of the arginine-rich protein edestin for 0.8 of the protein increase it.

Esophagotomy.—S. Bunnell (*Surgery, Gynecology, and Obstetrics,* March, 1923) concludes that it is possible to remove successfully the thoracic esophagus for some nonmalignant conditions and for carcinoma in a very early stage only. Great faith is necessary on the patient's part to face such an operation at a time before his symptoms have proved to him the seriousness of his condition. Still this is the only time when a removal of the esophagus for cancer can be successful. The first symptoms are usually pain and obstruction in swallowing. The pain comes when the free upward and downward excursion of the esophagus in the act of swallowing is interfered with by esophageal attachments. These symptoms denote a fair degree of advancement of the carcinoma. Diagnosis by tissue section at the onset of symptoms may make it possible to operate sufficiently early to give the patient a chance for cure.

Pin Traction in Fractures of the Forearm.—R. A. Koopmans (*Surgery, Gynecology, and Obstetrics,* December, 1922) asserts that in complicated fractures of the forearm, the pin extension method is to be preferred above other methods of treatment, because dressing of the wound is not impeded. In fractures of the forearm, with overriding of the fragments, this method of treatment deserves commendation, as the results obtained are good; in using this method, an operative reduction can be avoided.

Homatropine Cycloplegia.—William W. Lewis (*American Journal of Ophthalmology,* July, 1922) believes that his habit of prescribing a single instillation of homatropine the evening previous to the proposed examination of the eyes, done to promote a more efficient action of the drug, resulted in furnishing a danger signal in one of his patients, which enabled him to cut short an acute attack of glaucoma.

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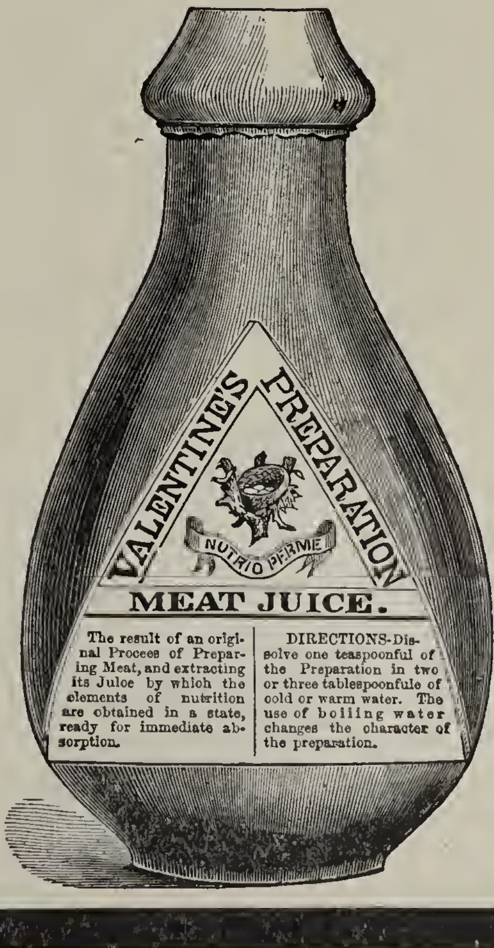
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MISCELLANY.

Anomalous Abdominal Membranes.—A. S. Taylor (*Annals of Surgery,* May, 1922) concludes that anomalous membranes are present in from fifteen to twenty per cent. of newborn infants. They result from atypical peritoneal fusion during fetal life. Many of them are probably modified by later pathological changes due to continued traction, irritation, or low grade inflammation. They occur in the hepatoduodenal region, at the duodenojejunal angle, and about the cecum, ascending colon, hepatic flexure and beginning transverse colon. Two or more of these regions are involved in the majority of individual cases. Groups of cases illustrating the results of treatment of the membranes found in the individual locations have been published by various men: hepatoduodenal group by Harris; duodenojejunal groups by Kellogg; and pericolic group (Jackson's membrane) by Jackson, but sufficient emphasis seems not to have been put upon the fact that two or more of these lesions exist in the majority of individuals who fall within the whole large group. They cause mechanical disturbances, fixation, angulation, compression and torsion of the digestive tract resulting in partial, continuous, and often increasing obstruction. This, in turn, frequently causes dilatation proximal to the obstruction. Symptoms result when the obstruction becomes greater than the peristaltic efficiency can easily overcome. This balance may be gradually lost over a long period of time, with resulting slowly increasing symptomatology. It may be suddenly lost as the result of a prostrating injury or illness, the obstruction remaining constant while the viscus, becoming atonic, is no longer competent to overcome it. Sometimes the viscus regains its relative power and the symptoms improve.

For a long time it was thought that these cases developed symptomatology only after twenty years or more of age. The investigations of Kerley in infants and children suffering from malnutrition, cyclic vomiting, recurrent acidosis, etc., show that abdominal examination and studies of the barium gastrointestinal series give precisely the same findings as do the older patients in whom operation has demonstrated the lesions, and caused cure in a high percentage of cases. This would indicate that symptoms appear in definite form at any period of life when the balance of peristaltic efficiency against the partial obstruction is lost. The symptomatology consists of: Digestive disturbances previously described; general nutritional disturbances; nervous debility, usually termed neurasthenia (and occasionally mild psychosis). At some period the appendix is likely to become tender to pressure, is assumed to cause the symptomatology by reflex action, whatever that may be, and is removed, with failure to cause improvement. There are usually tender spots in the midepigastrium, over the appendix, over cecum and ascending colon, and over the duodenojejunal angle, depending upon the presence of the various lesions. There is varying dilatation and ptosis of the stomach, and varying dilatation of cecum and ascending colon. In marked obstruction at the duodenojejunal angle the dilated duodenum can be made out. Examination of gastric contents and stools gives no evidence of value as a rule. The most important element of evidence is found in the barium gastrointestinal series. It must be a good series, with sufficiently frequent plates. The plates must be read by one experienced in these cases. It is common to receive typewritten reports that the plates are negative or that the digestive tract is normal when inspection of the plates shows characteristic evidence to be on the plates. Fluoroscopy should be done by one experienced in these cases, especially to determine the presence of obstruction at the duodenojejunal angle, indicated by marked distention of dependent duodenum, with writhing and rushing of the contents back and forth. The pictures are not quite so conclusive, and on the operating table the duodenum may be empty and the condition not so obvious.

The plates are likely to show: Hepatoduodenal membrane: The stomach dilated, ptosed, with varying peristaltic activity, with or without retention. The apex of duodenum fixed high, sharply angulated and showing little mobility. The cap is often deformed but not in the way characteristic of ulcer. The second part of duodenum is likely to be compressed and narrowed. Duodenojejunal angle obstruction: Dependent duodenum, if dilated, may or may not show definitely on the plates. Pericolic membrane: The hepatic flexure shows high fixation (often near the duodenal apex), angulation, and often transverse colon descends in contact with ascending colon. Cecum and ascending colon are dilated. Ascending colon often showing constriction at about its middle. Appendix, if still present, usually retains the barium for long periods. Ileocecal valve is often incompetent. Treatment: a, Prolonged medical. b, Surgical. Best incision is transverse right rectus, as it gives best exposure of the whole field, and postoperative adhesions are in least troublesome situation. c, Postoperative, abdominal massage, supervision of diet, and general hygiene.

Suture of Ruptured Left Dome of the Diaphragm.—C. Jennings Marshall (*British Medical Journal,* June 3, 1922) reports the case of a youth who was thrown from a bicycle and who, in addition to other injuries, showed a complete and striking absence of dyspnea. The mechanical condition simulated pneumothorax—lung collapse, mediastinal displacement, air in the pleural cavity, although it was enclosed in bowel. The loudness and superficial character of the rare borborygmi were nearly conclusive evidence of a hollow viscus in the thorax; there was also a succussion splash, induced by a jerk in the epigastrium. The heart did not return to its normal location. Operation by rib resection in the axilla resulted in no respiratory disturbance. The exposed omentum seen on opening the thorax was found with the greater curvature of the stomach which was distended and below it were the transverse colon and several coils of small intestine; the left edge of the liver just projected into the pleural cavity. The viscera were replaced with the aid of the elevation of the head and the removal of a supporting sandbag in front of the abdomen. The edges of the rent were freshened and sutured under little tension. Convalescence was uninterrupted. The röntgenograms showed the diaphragmatic outline to be irregular and ill defined; above it, up to the second intercostal space, there was a translucent area, typical of gas within a distended viscus. The stomach appeared in the thoracic cavity.

Bowel Torpor in the Elderly

is usually the result of a progressive atony of the bowel, with a gradual decrease of the natural mucus and other secretions. The loss of moisture dries the feces and interferes with their free and easy passage. Under such conditions

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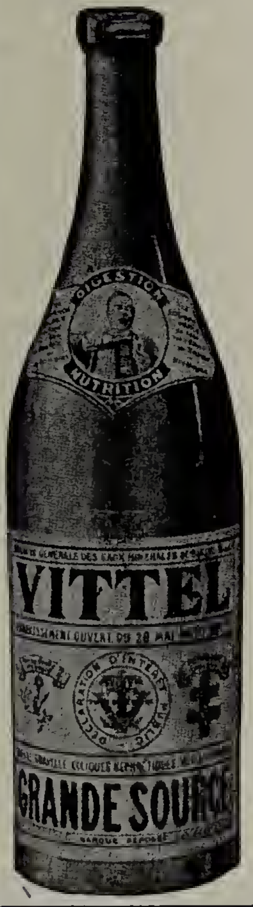

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Myokinetic and the Myotonic Function and the Diseases of the Tonicity of Muscle.—J. Pal (*Wiener klinische Wochenschrift,* September 21, 1922) differentiates between the kinetic and the functional elements of the function of muscle. The energy of motion consists of a cellular and an intracellular motion, which are of unequal value under different conditions. The intensity and extent of the cellular motion, aside from the innervation, also depends upon the tonus substrate, which is produced by a hypothetical working stock (energy) substance and composed of various elements. Muscle tonicity is the palpable expression of the peripheral accumulation of this working stock substance. The increase of the latter is a prerequisite of hypertrophy and its increase leads to atrophy. Changes in the tonus substrate (induced by congenital asthenia, intoxication and anomalies of internal secretion or of metabolism) form the basic conditions of the "diseases of tonicity," which may be either general or local, transient or permanent diseases of muscle.

Vaccination Treatment of Osteomyelitis.—A. v. Beust (*Schweizerische medizinische Wochenschrift,* August 31, 1922) obtained no true successes with vaccination in his cases with the smaller dose as advised by Grégoire. The vaccination is a valuable aid in the usual surgical treatment under certain conditions, but not in every case. The author believes that additional experiments should be conducted, particularly with more concentrated vaccine, as used by the French authors. In this way better and more significant results may be obtainable.

Scope of Vaccine Therapy.—C. E. Jenkins (*Lancet,* September 9, 1922) divides all cases that are suitable for vaccine therapy into three groups: Group I cases depend upon two cardinal principles: the bacterial origin of the disease and the preparation of the vaccine from the causal organism. Other subsidiary factors are that the patient's condition be capable of improvement, the age of the patient, the opportunity for rest and an adequate resistance of the patient. Alcoholic excesses are a predisposing cause of bacterial invasion. Another type of case that is often benefited by vaccine therapy is the sufferer from a disease in which only the secondary infection or complication is treated, leaving the primary cause to be taken care of by Nature, as in valvular disease of the heart complicated by chronic bacterial pulmonary infection. "Open" pulmonary tuberculosis is another type. The isolation of the causal organism may be simple or difficult, depending upon the difficulty in the identification of causation rather than in the obtaining of a growth, as in conditions of the intestinal tract. Group II includes conditions that govern the composition and use of prophylactic vaccines, in which it is essential that the vaccine should contain all the organisms likely to cause infection and also several strains of each organism. The duration of immunity is a minimum of twelve months. If recurrence occurs, it is of a milder type and of shorter duration. Group III includes catarrh of the respiratory passages, especially after an acute attack. The vaccine in such a condition should cover all the organisms commonly encountered as infective agents in the respiratory tract, including both those of the immediate infection as well as a good multistrain stock vaccine of the other organisms (semiautogenous vaccine). Such a vaccine is indicated in chronic rheumatism and in rheumatoid arthritis.

In vaccine therapy a constitutional disturbance should be avoided. The doses should be arranged so as to cause only a few hours of a "tired feeling" and the intervals between doses should be five to seven days. The number of injections should not exceed eight. The final improvement appears three weeks to one month after treatment has ceased. A second course may be given only after four to five months. The author prefers the residual vaccine to the old type of simple vaccine. Vaccine therapy should not be used as a last resort, but should be combined with other treatment, as in acute or chronic gonorrhea. The semiautogenous vaccine should also be used as a preliminary to surgical therapy to increase the prospects of success in operative work.

Symptomatology, Pathogenesis, and Radiotherapy of Erythremia.—Franz Högler (*Wiener Archiv für Innere Medizin,* April 5, 1922) was enabled to observe clinically five cases of erythremia, which showed a series of rarer symptoms in addition to the usual ones. He is opposed to the common clinical classification of this disease into the types of Vaquez, Gaisböck, Mosse and those with leucemic phenomena, and bases his conclusions only on the hyperplasia of the erythropoietic apparatus, on the basis of his clinical observations and of the pathologicanatomic findings as the cause of erythremia. The blood findings were reduced to normal or almost normal in all of the five cases by the application of highly active radium preparations to the bones; all of the other disease symptoms of erythremia also disappeared almost completely without special general disturbances. In one case the improvement lasted almost two years, when a recurrence set in, but a renewed treatment of the erythropoietic apparatus led to a complete cure without the occurrence of any disturbances.

Carcinoma of Breast. — Gage and Adams (*Annals of Surgery,* September, 1922) assert that no time limit can be set beyond which recurrence may not occur. Absence of malignant infiltration of axillary glands warrants much more favorable prognosis. Any lump in the breast is to be regarded with suspicion and carefully watched. Its persistence, and especially its activity, as indicated by increase in size, is ground for its removal, though not necessarily involving removal of entire breast. A continued discharge from the nipple means a pathological condition in the breast, must be kept under close observation, and be regarded with suspicion.

Bile in Blood.—DeWitt Stetten (*Annals of Surgery,* August, 1922) states in conclusion, that the icterus index determination is of value from the surgical viewpoint. 1. As an indicator of the absence or presence of jaundice and as an aid to diagnosis in doubtful cases, being more dependable and delicate than the inspection of the skin and sclera, or the examination of the urine. 2. As a method of accurately estimating, in frank icterus, the preoperative or postoperative increase or decrease in the degree of jaundice with the accompanying progression or recession of the disease. 3. As a guide in differential diagnosis, in the placing of operative indications and in prognosis, in cases of outspoken jaundice, by means of the study of the fluctuations in the index figures.

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Miscellany.

Milk Transmission of Pollen Hay Fever.—Edgar T. Herrmann (*Minnesota Medicine,* March, 1923) reports that previously sensitized guineapigs react by anaphylactic shock to intrathecal injections of milk containing ragweed pollen extract. Ragweed pollen containing milk gives a positive cutaneous reaction in high dilutions in sensitive individuals. Ingestion of milk from a cow which has eaten ragweed tops produces clinical hay fever within an hour after ingestion of the milk. Absence of gastrointestinal symptoms following one glass of milk and the appearance of selective anaphylactic phenomena in the upper respiratory tract may be due to chronic irritation and decreased resistance of the tissues involved. Ragweed pollen protein is found apparently unchanged in the milk of cows that have eaten ragweed tops some hours earlier.

Clinical and Pathological Study of Tonsils Subjected to X Ray.—Charles R C. Borden (*Boston Medical and Surgical Journal,* April 5, 1923) reports upon fourteen cases of diseased tonsils x rayed from one to four times which failed to show any clinical or pathological change, except that during the period when radiation was being given some tonsils seemed to be smaller. However, on removal by dissection there was no real change in size. After radiation many tonsils looked normal in size and color, but at operation a number of them were found to be filled with pus or cheesy débris. As a method of reducing bleeding and assisting in dissection at the time of operation, radiation is useful. By diminishing oversecretion from the mucous surfaces of the throat it decidedly decreased the possibility of postoperative pneumonia or lung abscess following throat operations. In cases where diseased tonsils may be justly suspected of producing secondary infection in the joints, heart, kidney or other important organs, x ray radiations are inadequate.

Action of Vaccines.—J. Pratt-Johnson (*Lancet,* October 7, 1922) states that marked anaphylaxis or hypersensitiveness to the related bacterial vaccine is found almost invariably in acute local and general infections and may be present in a lesser degree, or may be absent in chronic infections. Sensitiveness to vaccine may be demonstrated by inoculation of a minute dose of vaccine which is followed shortly by local, focal, and general effects. Such a dose is without effect on a healthy individual or on a subject not suffering from the infection, but the positive result can be seen in acute infections of the respiratory tract. Prophylactic injections of vaccine in a healthy subject produce excess of antibodies and frequently an associated leucocytosis: Where the causative microorganism develops an unusually high degree of virulence, as in a severe epidemic, a cautious prognosis is necessary; the antibody titre cannot invariably be accepted as evidence of established immunity in an inoculated subject. The action of vaccine employed prophylactically in individuals recently recovered from an acute attack or suffering from a latent infection, consists of a preliminary desensitization with small doses gradually increased until doses sufficiently large are employed to ensure a satisfactory antibody response. The severe reaction following the use of large prophylactic doses in individuals still sensitive to vaccine is actually due to a change in the patient or hypersensitiveness. In chronic infections, the injection of the antigen or vaccine gives rise to an overproduction of antibodies and a varying degree of leucocytosis. With minute doses in acute local infections, the vaccine produces a desensitization of the patient to the bacterial toxins generated by the infecting microorganisms. The repetition of the same dose is followed by diminishing effects and a gradual increase in doses is necessary to keep pace with the desensitization process until the dose is sufficiently large to be effective during the convalescence for the production of antibodies. The principle of the reaction is the same as that of protein desensitization and the action of the vaccine is similar in acute general infections and in acute local infections. The local reaction is best studied by making the inoculation superficially into the subcutaneous tissue and the size of the dose and the interval between doses are determined by the size and duration of the reddened area. A general reaction consists of a fall of temperature and sweating for six to twelve hours after inoculation, followed by the alleviation of symptoms and, frequently, a restful sleep. Intravenous injections of vaccine should be confined solely to chronic infections.

Effect of Bismuth on the Kidneys.—H. B. Day (*Lancet,* August 12, 1922) encountered certain toxic effects following the intravenous injection of bismuth, which are not usually mentioned in the literature. He used the liquor bismuthi et ammonii citratis (B. P.), which contains about nine per cent. of bismuth citrate. This was put up in sterile ampules. Injections of 0.5 or 1.0 c. c. had no general effect, but on repetition a black line formed on the gums with a stomatitis (sometimes), the condition resembling a mixed effect of lead and of mercury. But intravenous injections, especially with large doses of two c. c., produced no signs of poisoning; there were nausea or vomiting and slight diarrhea in most of the cases, but the most striking effect was a copious diuresis, without strangury or other signs of vesical irritation. When it was given in two cases of actual nephritis, one patient improved as a result of the diuresis and the condition of the other patient remained unchanged—neither improved nor aggravated.

Hemolytic Streptococcic Infections in Children.—I. H. Erb (*Canadian Medical Association Jaurnal,* January, 1923) says that most cases occur during the months of January to April. Males are more commonly affected than females. Nearly forty per cent. of all cases were fatal. Almost eleven per cent. of deaths from all causes are due to infection from this organism. Infants are very susceptible, thirty per cent. of all cases occurring in babies under six months old. In the bronchopneumonia cases empyema developed in forty-four per cent. of the patients of whom forty per cent. died. In ninety per cent. of the cases of peritonitis the patients died. Over fifty per cent. of the deaths followed tonsillitis, nasopharyngitis, or otitis media. Erysipelas in infants is frequently associated with septicemia and is usually fatal. Practically all cases of umbilical infection are fatal.

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Osmotic Drainage in Therapeutics.—Doumer (*Bulletin de l'Académie de médecine,* February 27, 1923) applies this term to a procedure calculated to rid mucous membranes or infected tissues of pathogenic matter which may be present in the intercellular spaces and which cannot be reached by antiseptics. Any hypertonic solution of a substance which is neutral, saline or organic, and devoid of caustic, may be used for the purpose. Simple syrup is convenient and acts powerfully. The treatment was first used in a case of blepharitis of eight years' standing, against which all forms of treatment except the static effluve had failed, even this measure proving too troublesome to be continued. Congestion involved not only the lid margin but also the conjunctiva and sometimes the sclera. The lid margins were greatly thickened and there was intense photophobia and a constant sensation of heat in the lids, with secretion sufficient to glue the lids in the morning. The treatment applied was to instil a drop of simple syrup in each eye every evening and place a small compress well moistened with it along each palpebral fissure. The syrup caused marked burning for a few minutes, and after it passed off a drop of fluid, containing expelled white concretions from the glands of the lids, exuded from the outer canthus. Even after the first application the photophobia and sensation of heat were markedly improved, and by the third day the patient was able to read, the thickening of the lid margins and conjunctival hyperemia meanwhile disappearing. After three weeks the treatment could be stopped without return of the preexisting congestive manifestations.

Thrombosis of the Coronary Arteries With Infarction of the Heart.—Joseph T. Wearn (*American Journal of the Medical Sciences,* February, 1923), from studies on nineteen patients observed in the Peter Bent Brigham Hospital, constructs the following as a picture of the typical case: We will find a patient, usually a man, possibly less frequently a woman, past forty and probably over fifty, complaining of severe pain over the heart or under the lower end of the sternum, or almost as frequently of pain in the epigastrium. Less frequently the complaint may be of a sudden attack of extreme shortness of breath, persistent and unrelieved by rest. The patient may have been in good or fairly good health the minute before being seized by an excruciating pain in the region of the precordium or in the epigastrium, which usually radiates into the shoulders and down one or both arms. Unlike angina attacks, which may have been experienced before, it persists for hours or days and relief at times seems impossible. Extreme dyspnea accompanies the pain, or may occur alone. The attack may come after exertion, or the patient may be asleep at the time. Closely following the pain and dyspnea may be nausea, vomiting, weakness, and even collapse. The skin is pale ashen in color, moist and cold. The face presents an intense expression of anxiety and suffering. A few signs of edema may be heard in the lungs. The heart is moderately enlarged and very weak. The liver is likely to be enlarged and may or may not be tender. Fever and a polymorphonuclear leucocytosis occur with sufficient constancy to make them of definite value in recognizing the condition.

Recent Cancer Therapy. — Francis Carter Wood (*Canadian Medical Association Journal,* March, 1923) sums up his excellent discussion of what is now known concerning the therapy of cancer by advising operation in all cases of operable malignant growths. He says that to treat such a growth by radiation methods assumes that we know the exact amount of radiation necessary to kill all the cancer cells, but this we positively do not know at the present time for human tumors. The assumption that if a part of the tumor is killed by radiation the body cells will destroy the rest is pure phantasy without the slightest foundation either in clinical observation or experimental work. If the body tissues had any power to destroy carcinoma cells, a malignant tumor would be destroyed in its inception, and the fact that it is not is definite proof of the lack of any such protective capacity. In borderline and doubtful cases a combination of radiation and surgery is often the most effective. The type of radiation to be used depends upon the site of the tumor, the extent and nature of the surgery upon the same factor. Inoperable carcinoma should be treated with radium if small and fairly well localized; with the x ray if extensive. Operation is useless in inoperable cases and tends to make the patient worse rather than better. In many cases no palliative effect is obtained from any form of radiation; in others the tumors seem to be of low biological resistance and remarkable palliative effects are obtainable, which may last for a considerable period of years, accomplishing a result in a condition before which surgery is powerless. The hope of making extensive inroads into the death rate of cancer lies in publicity, to bring the patients early to the surgeon. The task of the surgeon is to improve his technic and extend his operative field so that all of the tumor can be removed as promptly as possible. If this cannot be accomplished, we have in radiation an extraordinary palliative measure which prolongs life and adds to the comfort of the patient. If no cures were ever obtained by either radium or x ray, their use would be justifiable on account of the valuable palliation they often offer.

A Method for the Permanent Sterile Drainage of Intraabdominal Ducts, as Applied to the Common Duct.—Peyton Rous and Philip D. McMaster (*Journal of Experimental Medicine,* January, 1923) report a method by which the total bile may be collected in a sterile state day after day, during months and probably for years. The success of the method lies in the interpolation, with special care for asepsis, of a long drainage tube between the common duct and the opening in the abdominal wall. The tube must be pliable near the cannula, or the latter may be pushed askew through leverage exerted by the viscera, with obstruction as result; it must be resistant where it passes the abdominal wall to sustain muscular contraction. To fulfill these requirements a curved glass tube is used with, on one limb, soft black rubber tubing that connects with the cannula, and on the other, a piece of red duodenal tubing that is to pass through the abdominal wall. The entire U of rubber and glass should be as long as the abdominal cavity will readily permit—ten to twelve cm. in a large animal. If a short tube is used it will regularly come away after a few days.

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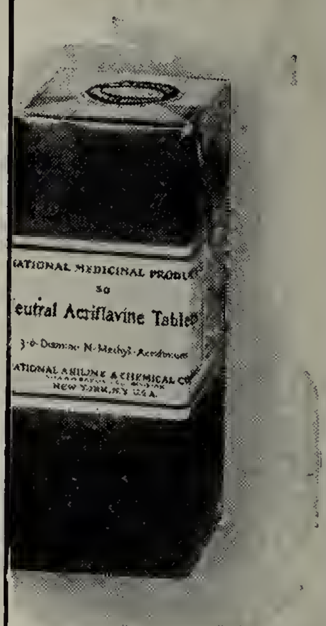

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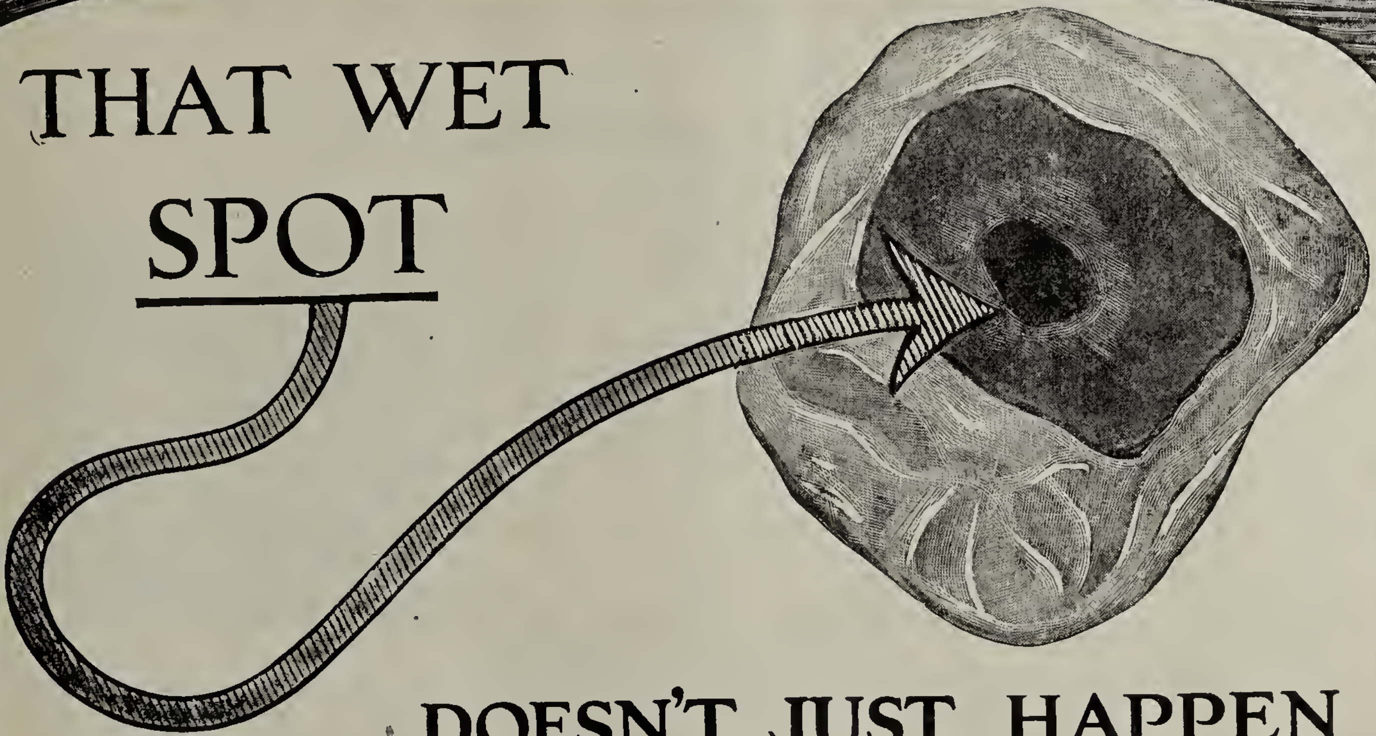

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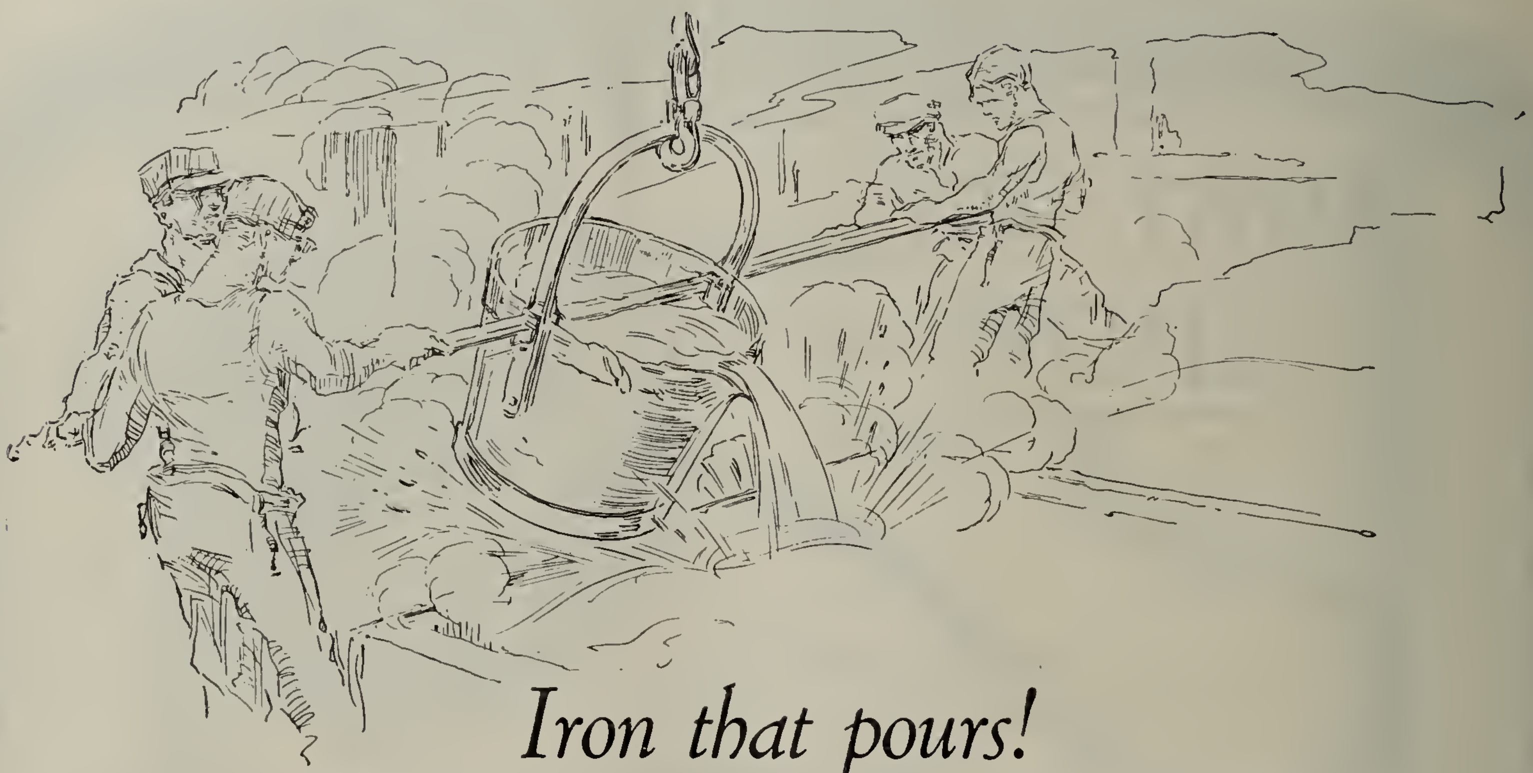

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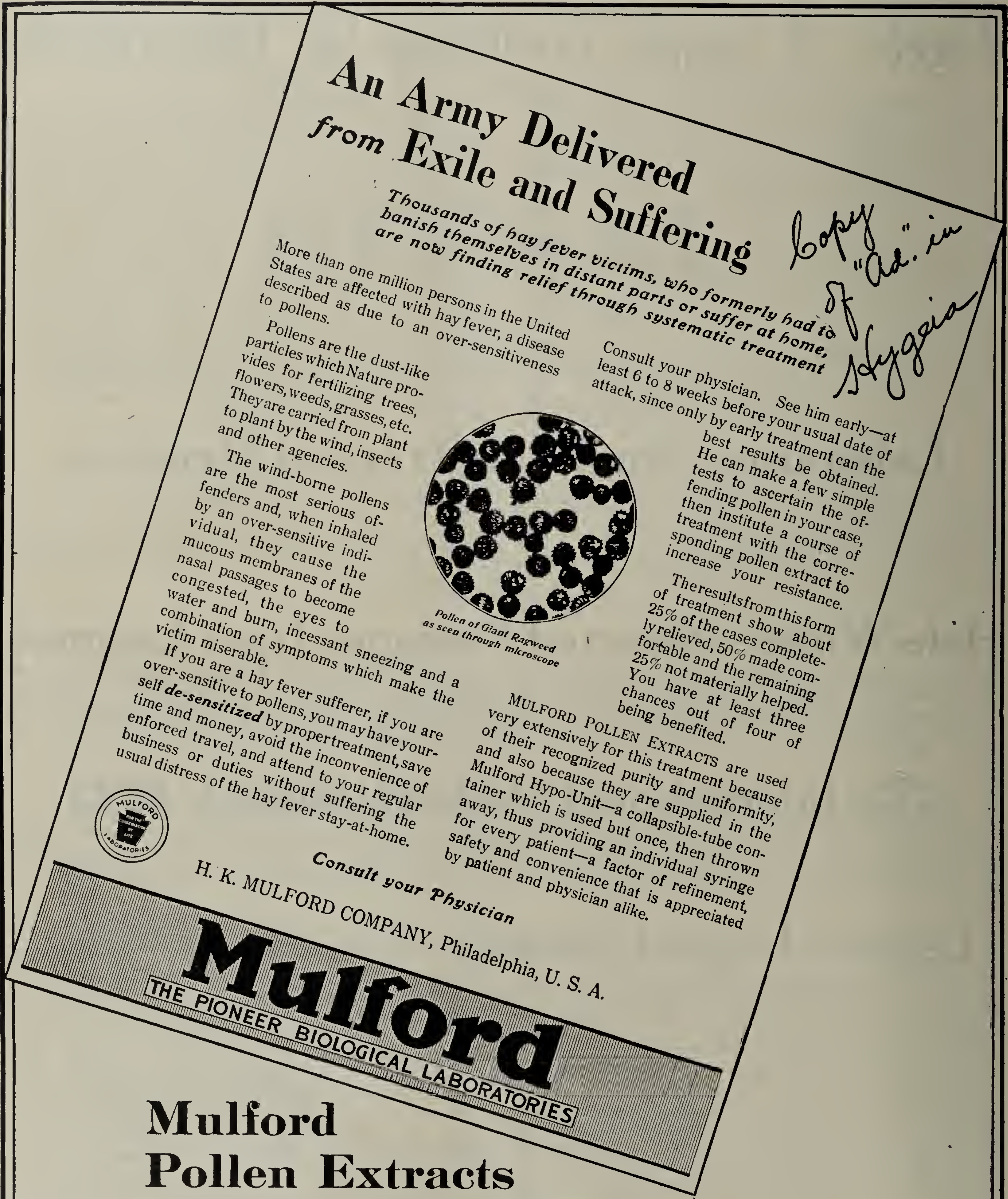

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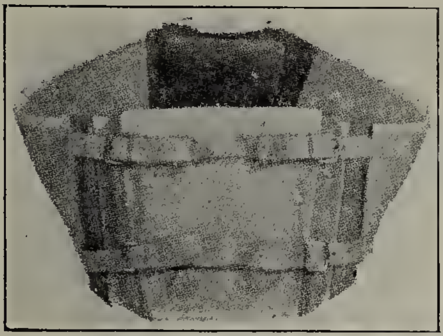

FRONT VIEW

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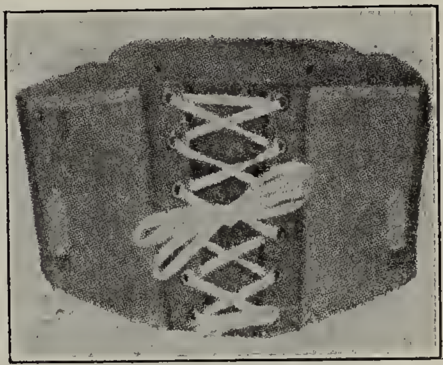

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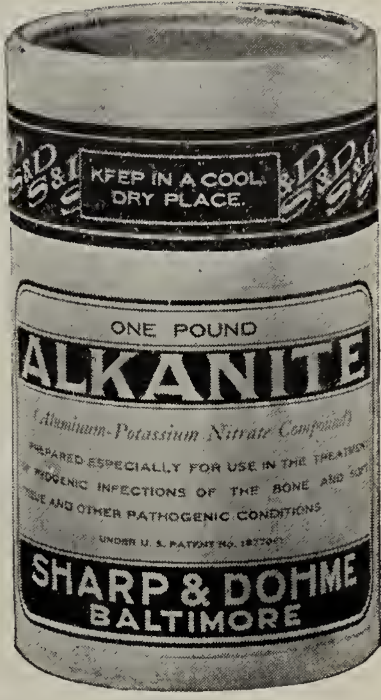
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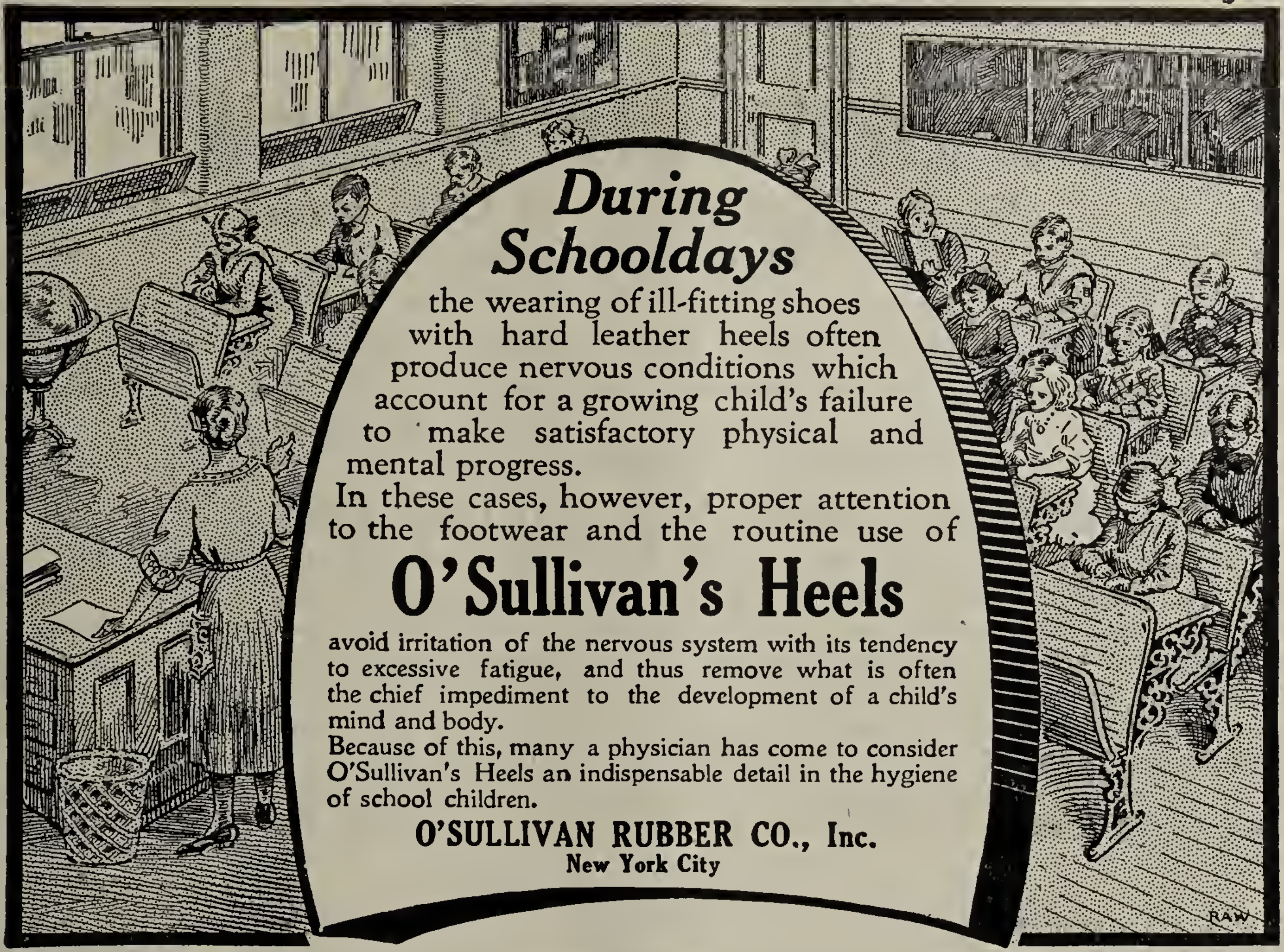

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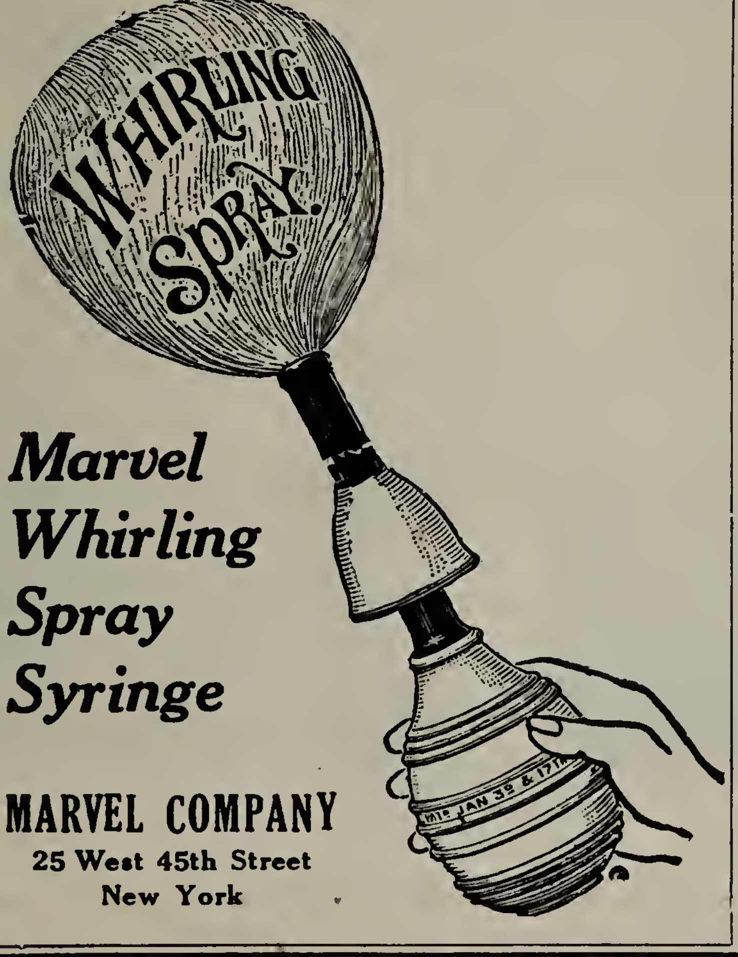

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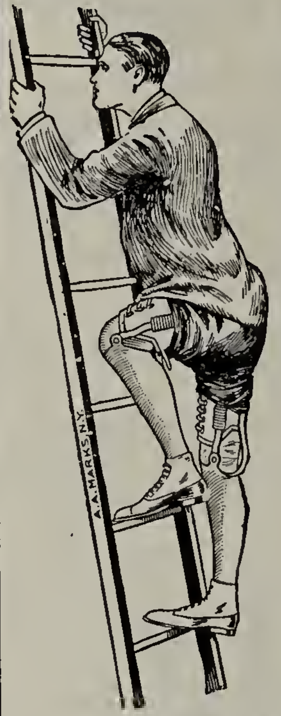

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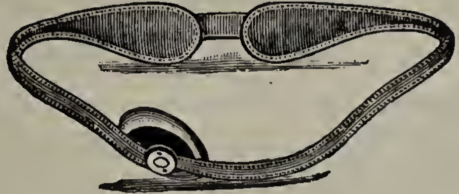

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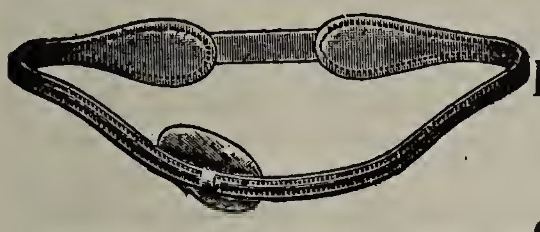

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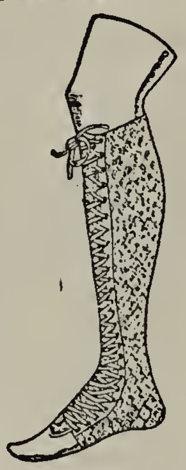
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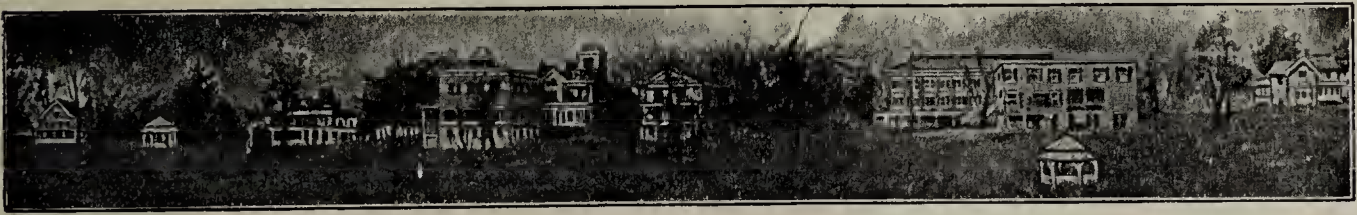

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